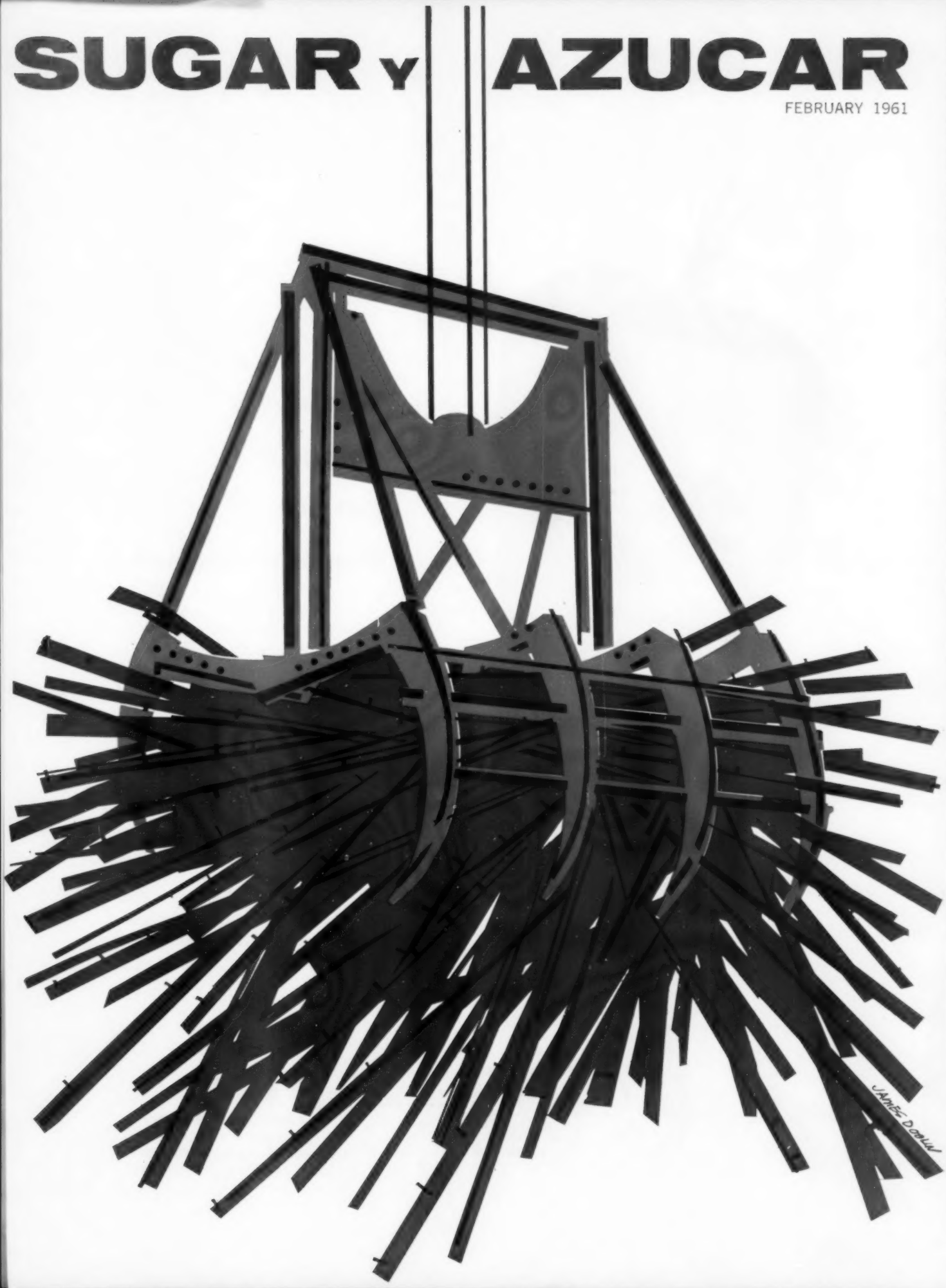
# SUGAR y AZUCAR

FEBRUARY 1961



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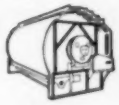
4  OLIVER-CAMPBELL FILTERS

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Sugar y Azucar for February, 1961, Volume 56, No. 2. Published monthly by Russell Palmer Trust, Mona Palmer, Publisher. Publication Office, 109 Market Pl., Baltimore, Md. Editorial and executive office, 25 West 45th Street, New York 36, N. Y. Accepted as controlled circulation publication at Baltimore, Md.

# SUGAR y AZUCAR

*Volume 56 No. 2 February 1961*

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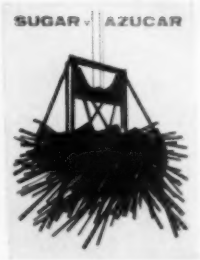
**COVER** *As yields per acre and costs per man-hour increase the vast tonnage of cane that must be handled to meet the world's demand for 57 million tons of sugar requires heavy mechanical equipment. One phase of this mechanical handling is suggested on this month's front cover by our artist, James Doolin.*




**PORTADA** *Segun aumentan los rendimientos por acre y los costos hombre-hora, se hace más imperativo el empleo de equipos mecánicos pesados para manejar el vasto tonelaje de caña necesario para producir 57 millones de toneladas de azúcar y satisfacer la demanda mundial. Nuestro James Doolin expone artisticamente en la portada un aspecto de la manipulación mecánica.*

*Publisher,* MONA PALMER
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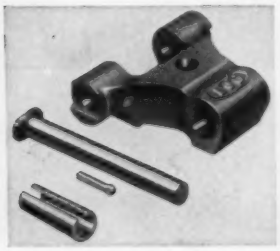

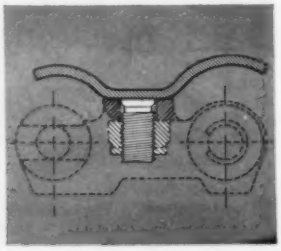

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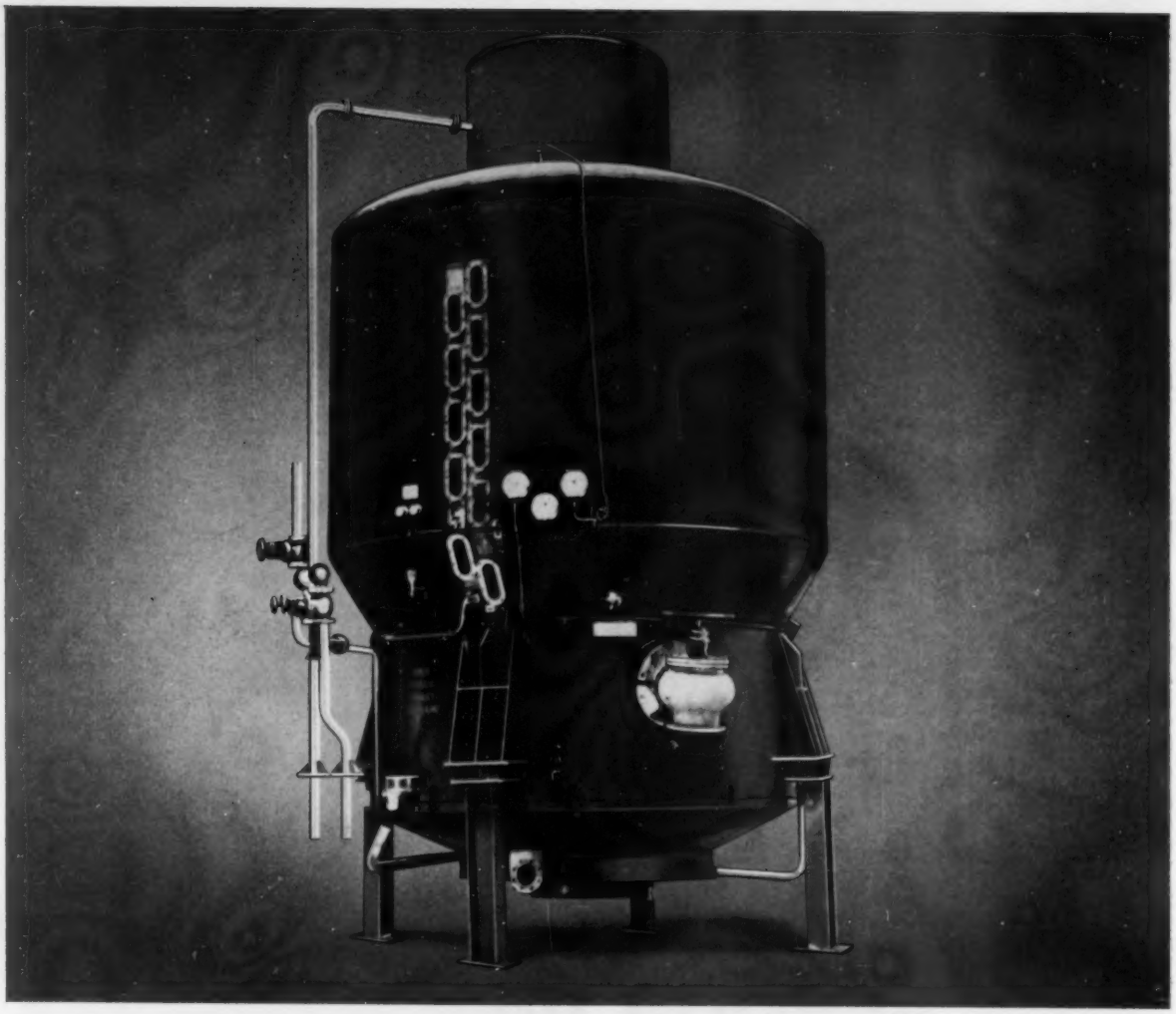

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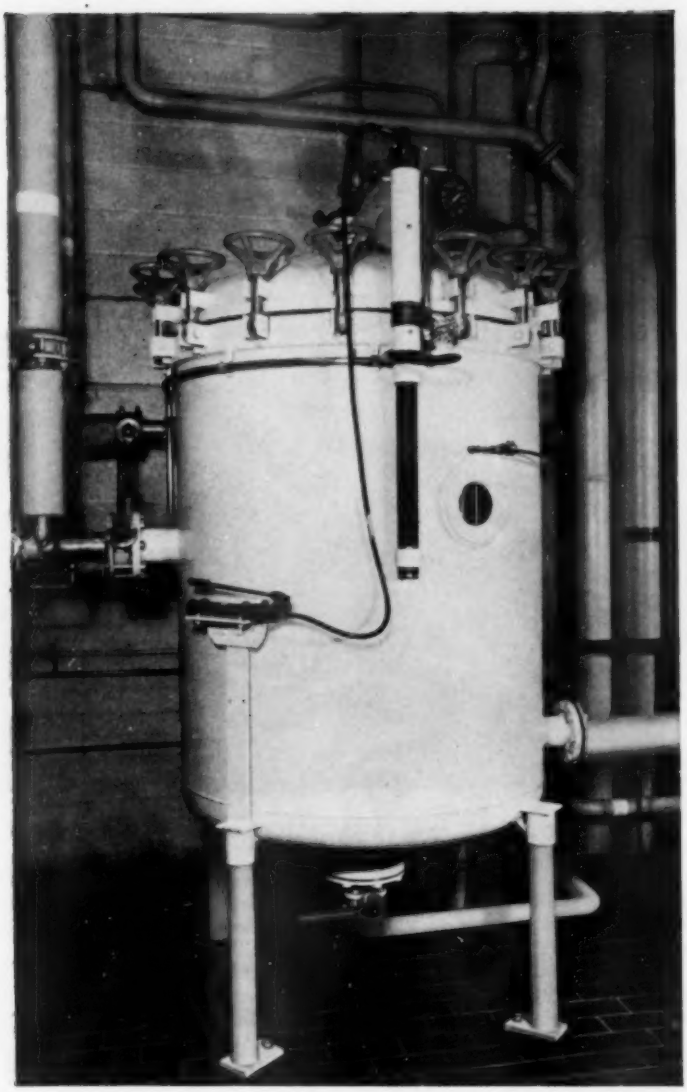

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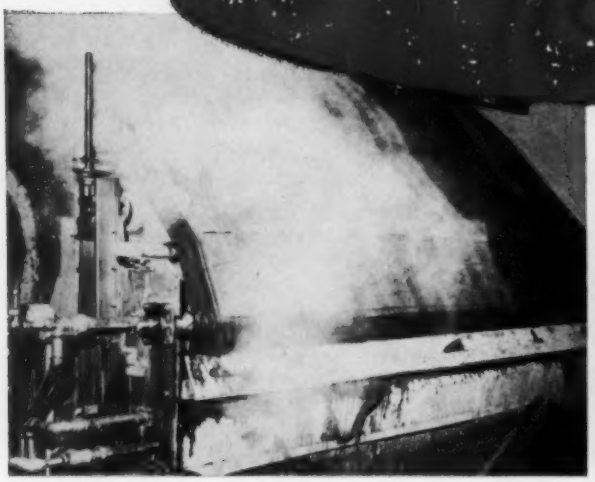

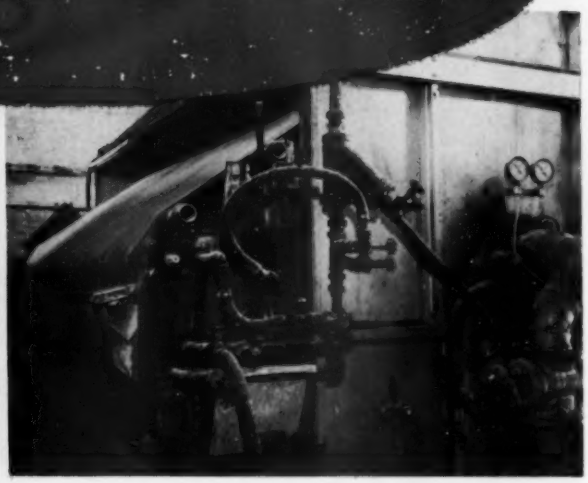

**IN CANE SUGAR PROCESSING . . .**

**EimcoBelt filters have demonstrated their ability to produce a filtrate clear enough to be sent directly to the evaporators. With EimcoBelt continuous belt filters, it is not necessary to recycle filtrate solids to the mill juice clarifier. Inversion loss and destruction of sucrose caused by contact with slimes during recycle are eliminated. Increased purity of the clarified stream results in increased sugar recovery.**

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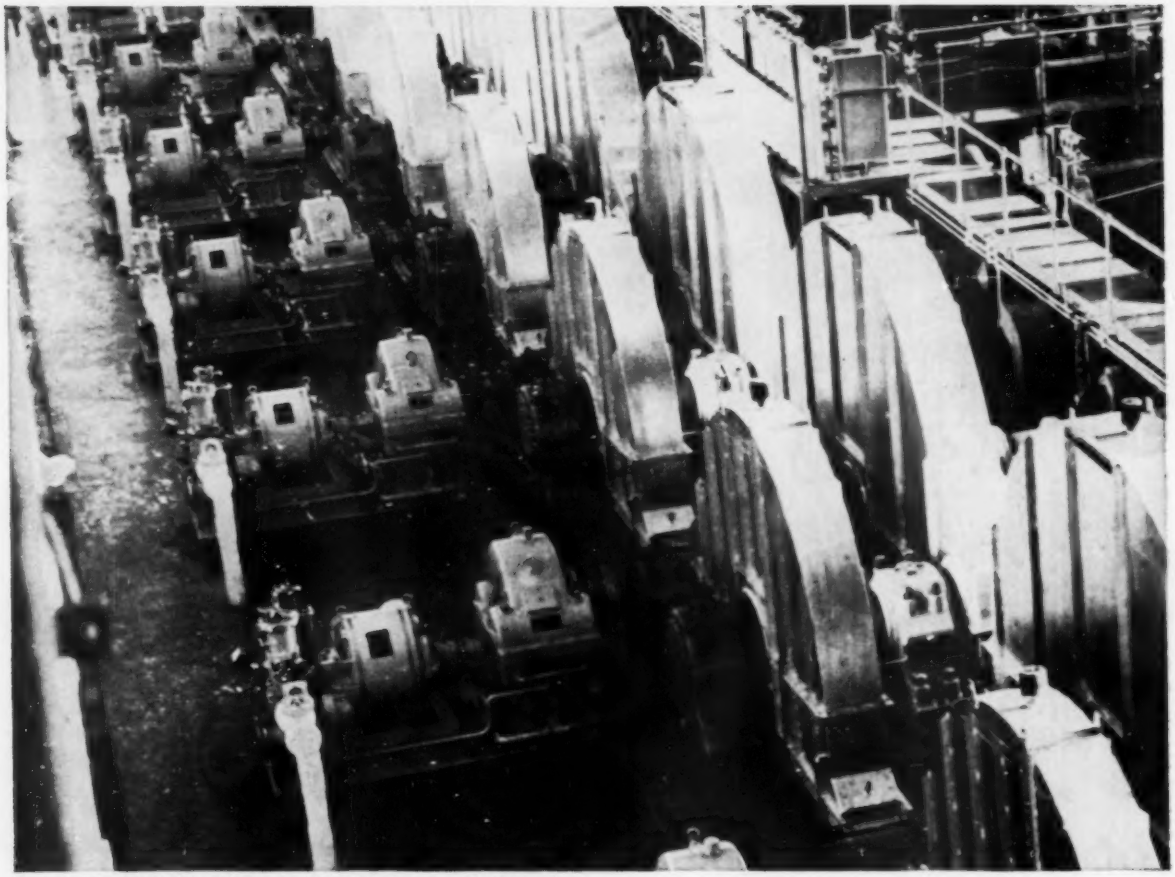

Five of seven 400 HP Worthington turbines driving sugar mill in Brazil

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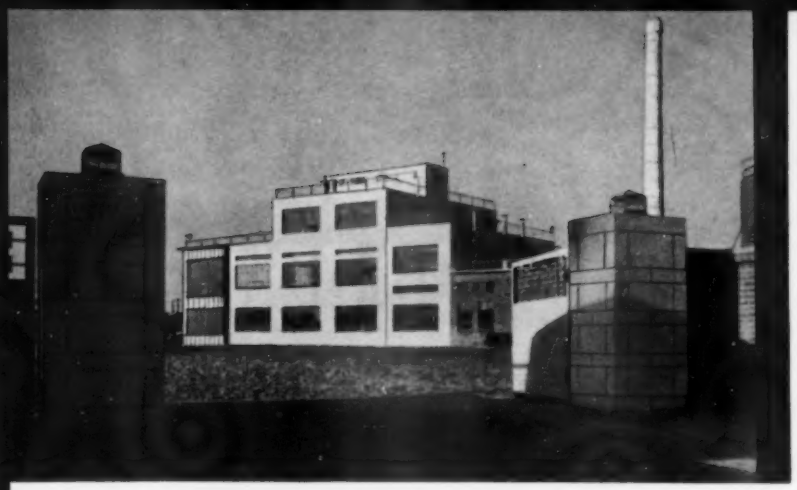

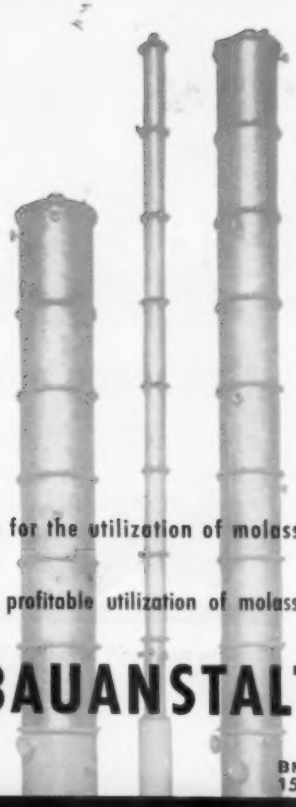

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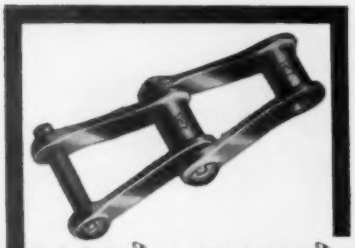

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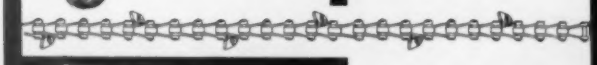

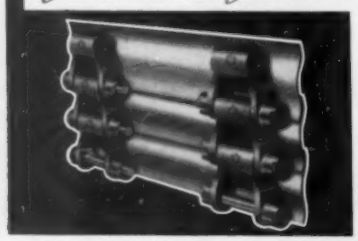

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# EUROPEAN News & Notes

## *By our London Correspondent*

HARVESTING and transportation of sugar beet in the UK has continued satisfactorily despite rainy weather and difficulties of movement from farms due to the very widespread and serious outbreaks of foot and mouth disease. Fortunately the general mildness in November and early December prolonged the growing period and in mid-November the British Sugar Corporation was said to be maintaining a daily processing of over 50,000 tons of beet per 24-hour shift, a very high figure for the time of year. It was estimated early December there were still about three million tons to deliver to the factories.

If the official crop estimate proves reasonably accurate, the corporation feels the UK should attain a 6.5 million ton beet crop for the first time. At the time this feeling was expressed, however, it was too early to guess at the sugar content.

Despite a possibly lower sugar yield, the mid-December estimate of total sugar was 850,000 long tons, 77,000 tons more than last season.

THE report of the Tropical Products Institute Committee (Department of Scientific and Industrial Research) for 1959 states that the five-year plan programme for 1959/64 has been examined at DSIR request. In its conclusion the committee has expressed the wish to give priority to those projects which are directed towards immediate industrial problems or which promise application within a relatively short period.

Typical of the problems put before the committee under the heading of "Economics," was the request to consider the possibilities of marketing in the UK industrial alcohol produced in Mauritius from molasses. In view of the dominant position now occupied by synthetic alcohol from petroleum, it was not considered possible to recommend investment in new plant for alcohol production by fermentation, particularly since at present a considerable proportion of the molasses produced in Mauritius is used as a fertilizer, part of which, at least, would have to be replaced by imports. There is moreover an established market for the molasses for feeding stuffs.

Other factors which militate against any expansion of alcohol production for export from Mauritius are the long distances from markets, lack of regular tanker service, and competition from other countries more favorably placed from the economic aspect.

Tanganyika is another country interested in processing and marketing molasses, and the authorities there were informed that freight costs might be unfavorable for overseas marketing. Details were supplied of a method for drying the molasses on a commercial scale.

Although virtually the whole of the world's sugar production is consumed as food, the committee's research division stresses that it has a number of attractive features which should commend it to industry for exploitation.

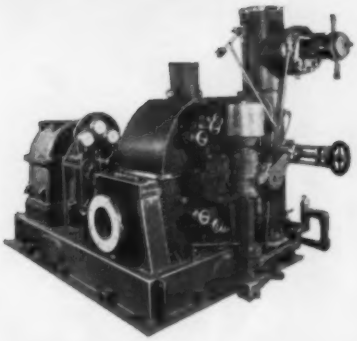
In this connection the report mentions the research in hand

# Mirrlees' STEAM TURBINES for the Sugar Factory

**MIRRLEES STEAM TURBINES COVER A WIDE RANGE OF APPLICATIONS IN THE SUGAR FACTORY**

**FROM** **CANE KNIVES DRIVE**

Illustrated is a F.E.A.7, 350-400 B.H.P. turbine with constant speed governor and fitted with a reduction gearbox, supplied for driving cane knives.



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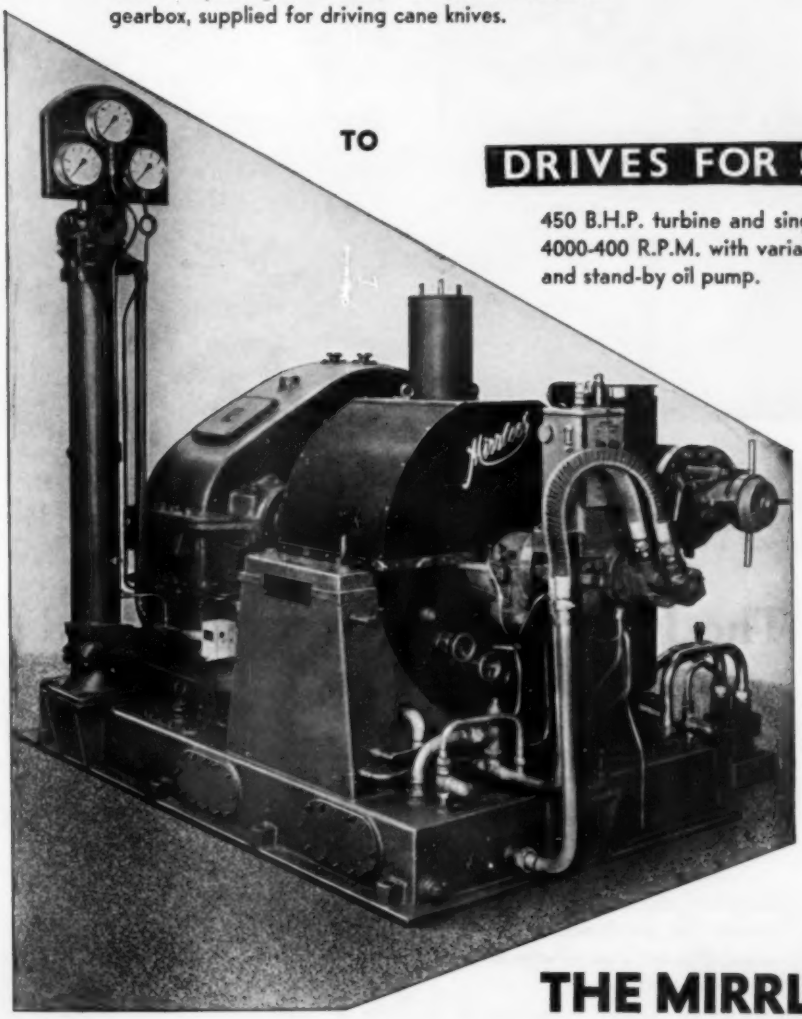


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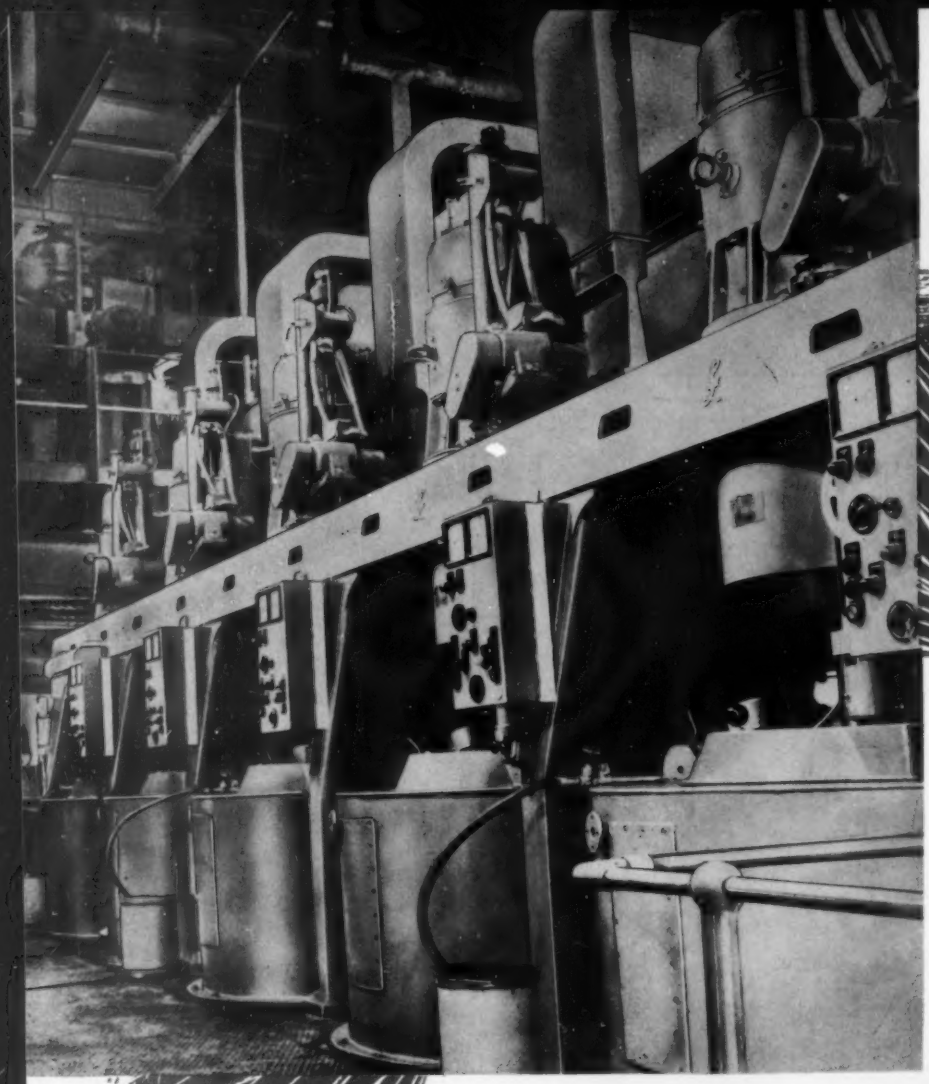

A battery of 6 48"x30" 1,300 r/m. completely automatic centrifugals with Leonard Drive at The Millaquin Sugar Co., Bundaberg, Australia.

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directed towards the production of materials, based on sugar and naturally-occurring fatty acids, which have surface-active properties. This investigation is being supported financially by the U.S. from funds made available under Public Law 480 administered by the Department of Agriculture.

The comment is made that if such materials could be made with properties comparable with existing commercial detergents and competitive, they would find a wide field of applications as they would be non-toxic and also readily decomposed during normal sewage disposal processes.

A number of papers and patents have already appeared which describes the preparation of sucrose esters such as the oleates, palmitates, stearates, etc., by interacting the sucrose with an ester, such as methyl stearate in homogeneous solution in the presence of an alkaline catalyst.

This report is published by the Government office, London, price 2s. 6d. net.

An article on British Agricultural Machinery in "The Times Review of Industry" comments that in sugar beet cropping the use of machinery meets with greater success and produces remarkable savings, as does mechanized sowing. Mechanical thinning is as yet not widely accepted, it asserts. In harvesting, 40 man-hours an acre can be saved by the use of machinery. A great deal of improvement can be achieved by the production of a monogerm seed, but at present attention is being concentrated on the development of a drill capable of sowing at a uniform and predictable rate over a large area.

One firm has developed such a machine which also deposits a dose of weed-killer. However, progress in harvesting already is such that many machines can deal with 14 tons an acre density of beet with four man-hours an acre. Nevertheless 6% (17.5 cwt an acre), it is asserted, remained unpicked. Such losses amounted to half the saving effected. The problem of producing the best and biggest crop as cheaply as possible begins with planting and may be only soluble by considering very many variables external to farming.

Ste. Madeleine Sugar Co. made a trading project in the year ended June 30, 1960, of £263,823 *(against £273,814 in the preceding year)*, and a net profit of £170,559 *(£185,986)* after depreciation £107,652 and taxation £132,986. General reserve is allocated £50,000 *(£100,000)* and the dividend is maintained at 8% tax free. Carry-forward is £144,055 *(£119,496)*. Capital commitments not provided for are estimated at £85,000.

Sugar production (in tons) totalled 73,178 *(65,982)* of which 62,113 *(55,642)* came from the Ste. Madeleine factory and 11,065 *(10,340)* from the Reform factory.

The Chairman—J. M. Du Buisson—reports that the 1959/60 crop was a record despite the canes having a poorer sucrose content than in 1958/59, though a better tonnage per acre. Though the quantity exceeded the company's basic quota, it disposed of the entire output through quota allocations from other territories under the Commonwealth Sugar Agreement and through a small allocation from the U.S. for immediate shipment in 1960.

The proposal to replace the east mill in the factory to enable the company to grind at a higher rate has been postponed for further consideration.

The year was comparatively free from the attacks of insect pests, though preventive measures have still to be employed. Cultivation has benefited from Trinidad's Central Agricultural Research Station activities, whose work on insecticides and herbicides is now beginning to bear considerable fruit.

As to the next crop, the chairman admits forecast is not easy but he hopes, barring unforseen factors, for a crop not less than the last one, as the growing season so far has been favorable.

Another company to issue its report and accounts recently is the St. Kitts (Basse Terre) Sugar Factory Ltd. whose estates are in the Netherlands Antilles.


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Its profit and loss account for the year ended August 31, 1960, show a net profit before St. Kitts taxation of £110,174 *(against £103,849 in 1958/59)*. Net proceeds amounted to £1,878,824 *(£1,807,318)* for 50,179 tons of sugar, and £24,606 *(£48,600)* for molasses. Canes purchased totalled £1,133,272 *(£1,137,839)*. After providing £70,000 *(£63,662)* for taxation, the balance of £40,174 *(£43,187)* goes on dividends.

The directors report that crop started on February 3 and was terminated September 12, with an out-turn of 50,179 tons of sugar. Very favorable growing weather was experienced throughout and the final figure was substantially higher than originally estimated. Sugar for export amounted to 46,460 tons, of which the company's negotiated price quota of 31,051 tons was sold to the Sugar Board at £44. 8s. 10d/ton payable as Special Funds. The balance is estimated to realize an average price of about £10. 6s. 0d/ ton less than this. The first payment for canes was 47s. 11.9d/ton.

Profit and loss account of St. Kitts (London) Sugar Factory Ltd., holder of a 50% equity in the above company—reports a net profit after taxation of £47.833 *(£45,-794)*. Dividend is repeated at 5%, tax free, and the balance of unappropriated profit carried forward is £8,768 *(£14,046)*. Authorized and issued share capital has been increased to £390,000 and £260,000 of fully paid shares was distributed on the basis of two new shares for every one held. This was effected by capitalizing $38,063. 5s. from capital reserve and £221,936. 15s. from general reserve.

Attention may usefully be drawn briefly to the publication by the British Colonial Office of "Colonial Research 1958-59" (Government Stationery Office, price 18s. net). This 420-page volume brings together the reports of 11 official research bodies covering a very wide range of long-term investigations, and work concerning sugar cane growing finds frequent mention.

Several pages, for instance are devoted to the British West Indies sugar research scheme at the Sugar Technological Laboratory, of the Imperial College of Tropical Agriculture, Trinidad—work ranging from clarification studies to testing on APV "Paraflow" heat exchanger and the production of hardboard from bagasse.

In Barbados research is proceeding to find alternative methods of maintaining yields, including mechanization, because the positive use in labor costs is affecting the economic value of mulching sugar cane, a long established practice in the island; in St. Kitts work is proceeding on the control of mealy bug by soaking setts with Dieldrex Teepol followed by an application of BHC/limestone mixture after planting.

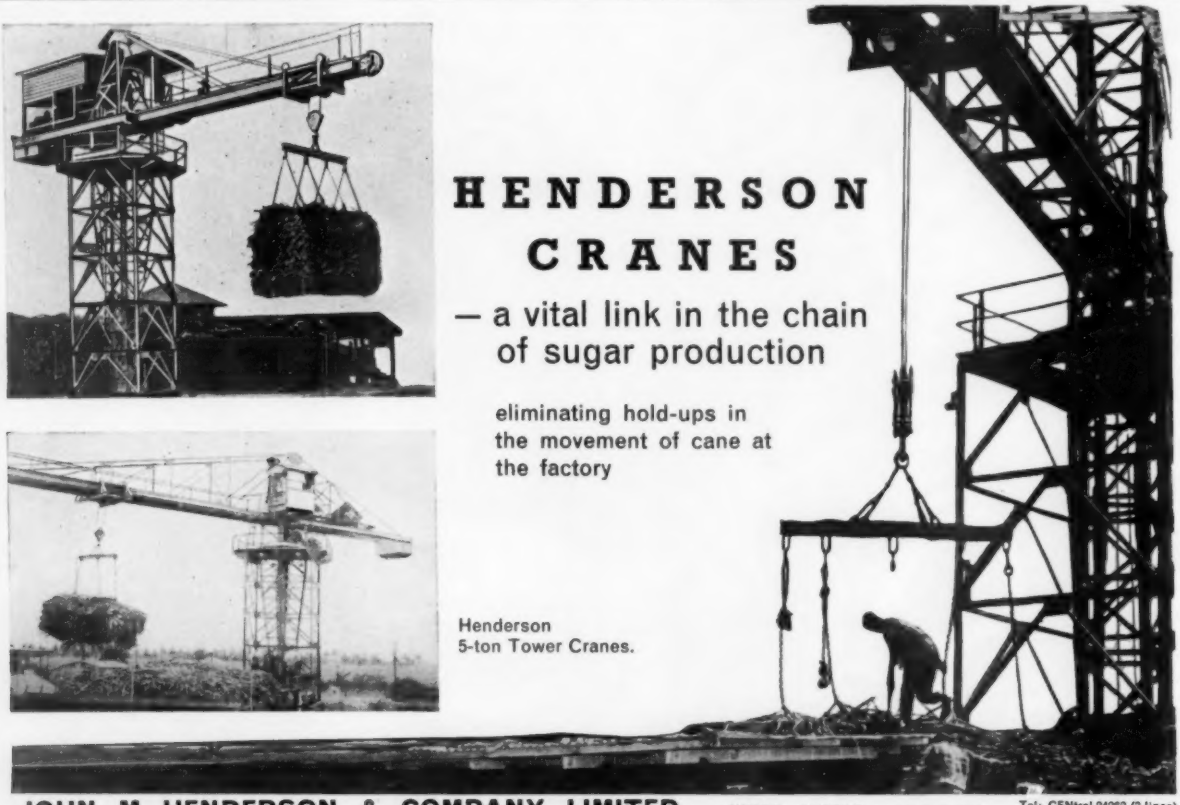
NEWS in the equipment field reports the receipt of a contract by Sigmund Pumps Ltd. of Gateshead-upon-Tyne for 50 pumping sets valued at £80,000 for incorporation in complete sugar factories supplied by Vickers and Bookers Bros. as part of a £10 million contract for the USSR. As part of another Iron Curtain order, Catchpole Engineering Co., Bury St., Edmunds (Suffolk), has recently dispatched five "Cadet" sugar beet harvesters to Sofia, the first order it has received from Bulgaria, though shipments have recently been made to USSR, Czechoslovakia and Hungary. These harvesters—standard production models—employ five different methods of delivering roots and tops to suit the various requirements of Bulgarian growers.

Considerable interest has been aroused by the recent first showing of an inexpensive unique device which is claimed to make a positive and effective contribution towards greater safety on farm or estates. This is an exhaust brake, patented by David Brown Tractors, Ltd., of Huddersfield (Yorkshire), and the first of its type to be developed especially for use with agricultural tractors.

Available with its 850 and 950 Implematic diesel tractors and easily fitted to similar models already in service, this pedal-operated auxiliary braking power, apart from the increased safety factor, has obvious advantages in retarding heavy trailer loads on grass and steep or slippery surfaces.





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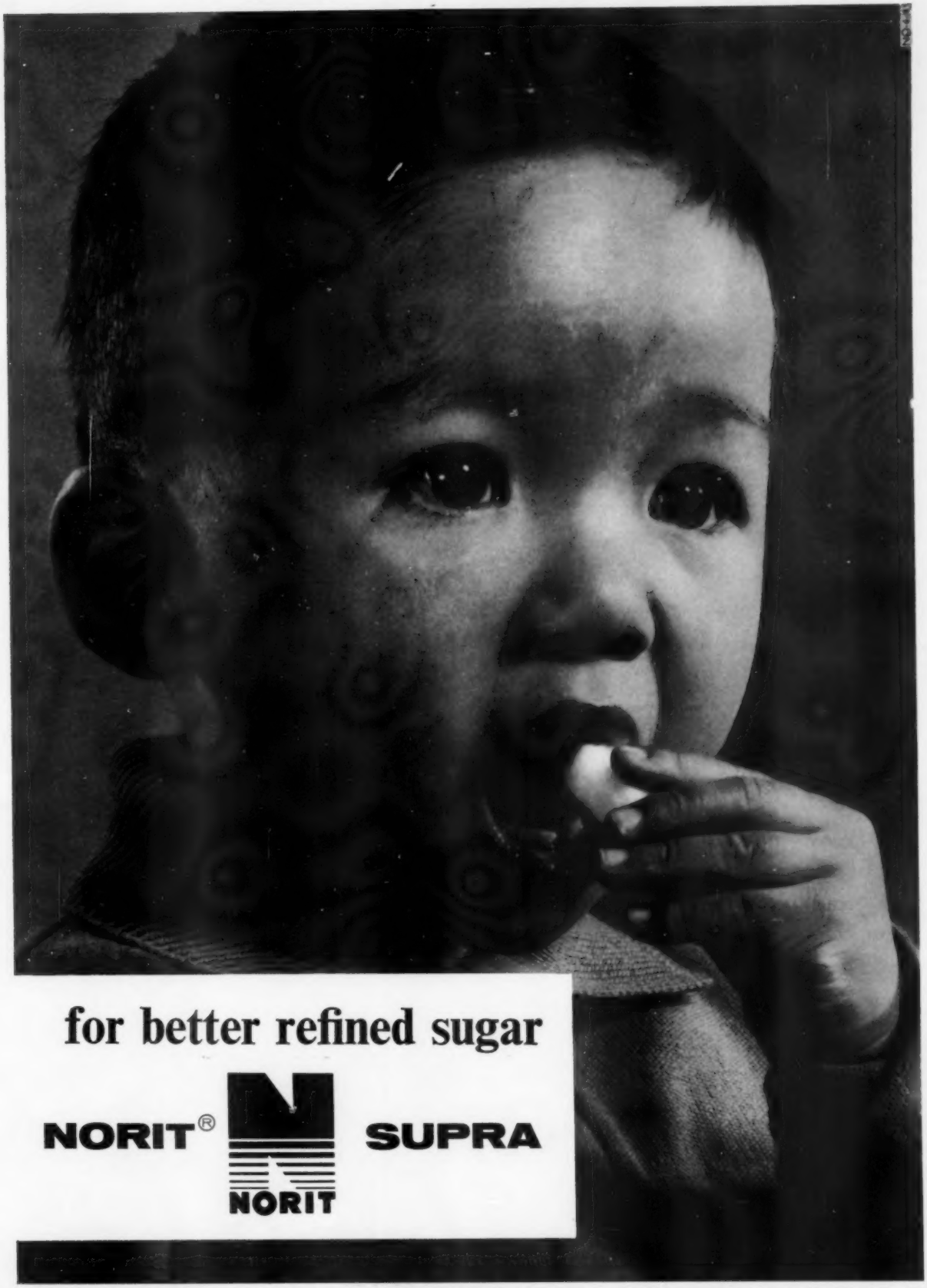


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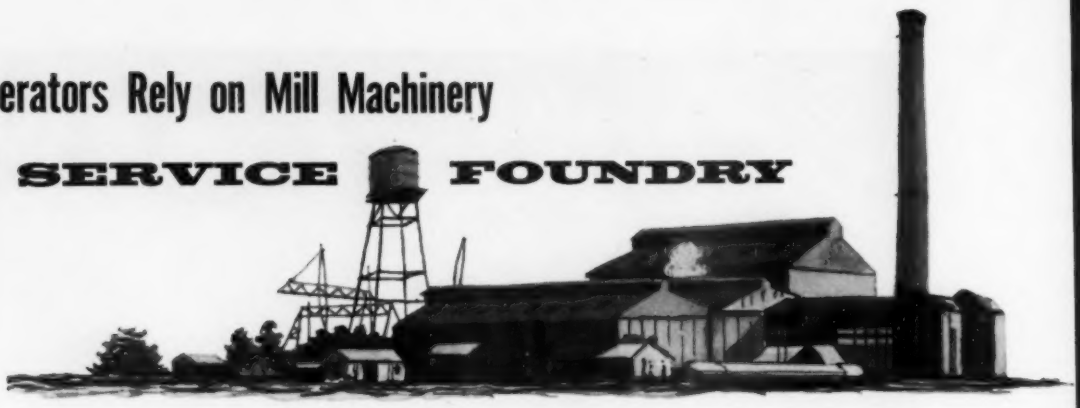

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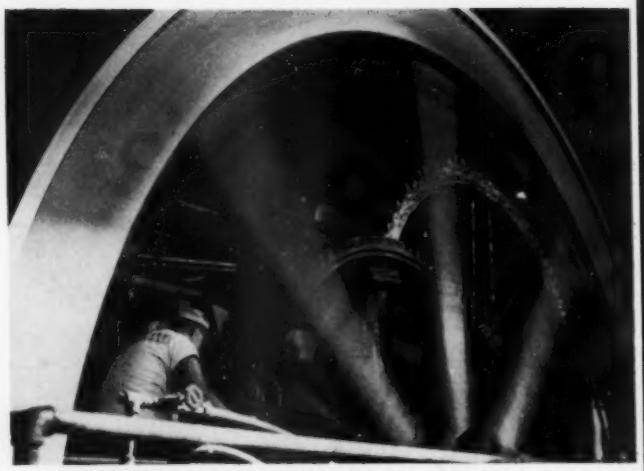
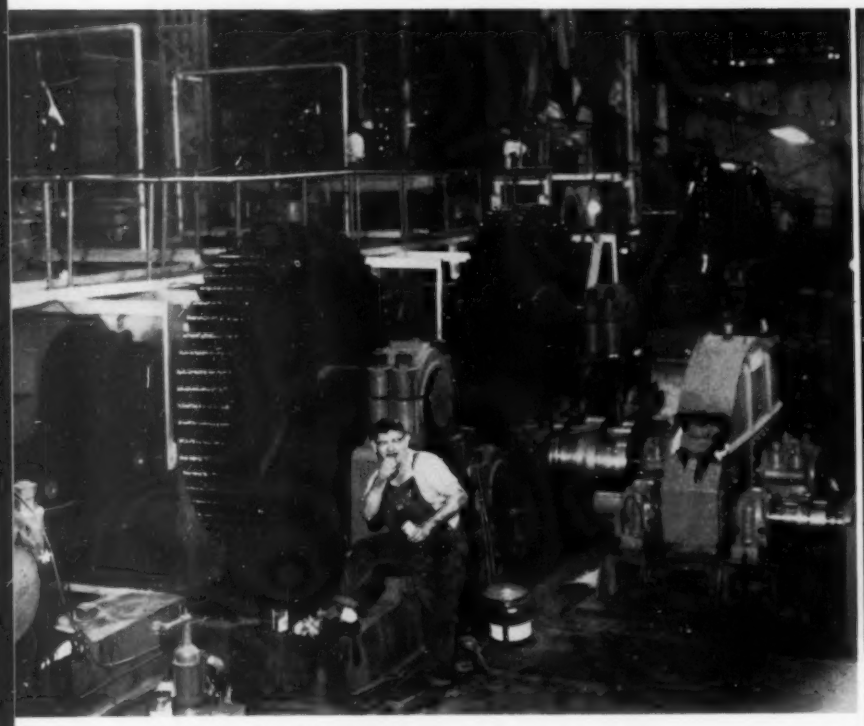
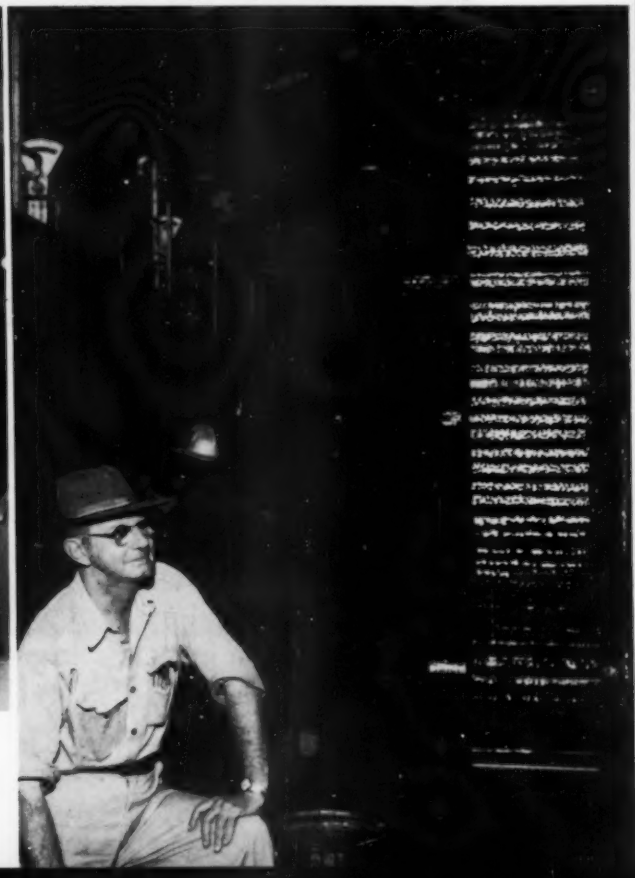


LEIGHTON FACTORY, Thibodaux, La., Mr. Irving E. Legendre, Sr., Gen. Mgr. Cut steel gears by Service.

CORA TEXAS FACTORY, White Castle, La., Mr. H. A. Rousseau, Engineer. Service gears and bearings.



CEDAR GROVE, White Castle, La., Mr. L. Calliet, Engineer. First and fourth mills by Service Foundry.

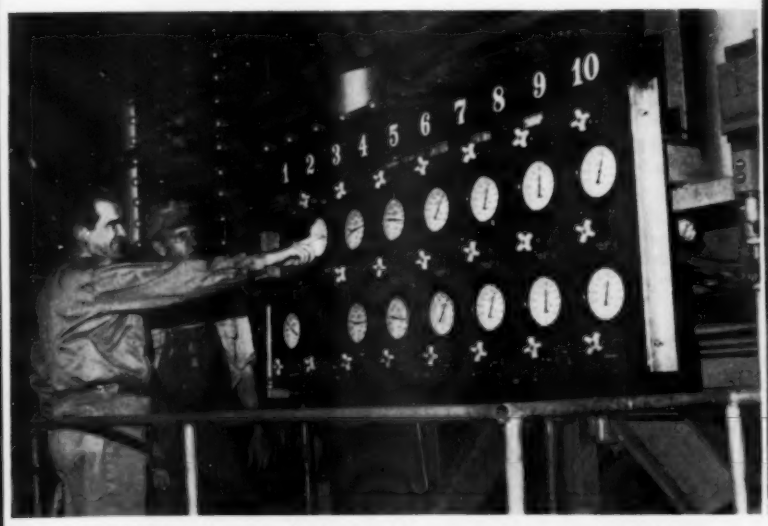


WESTFIELD FACTORY, Paincourtville, La. Mr. Walter Aucoin and Mr. Charles C. Savoie, Vice-Pres. Service crown wheels, bedplates.

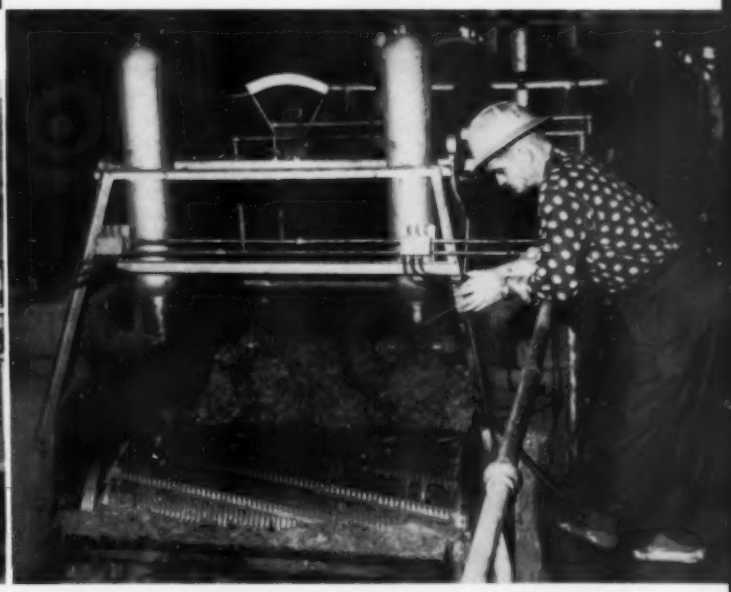
LULA FACTORY, Belle Rose, La., Mr. Patrick Cancienne, Engineer, and Mr. Maver Landry. Service Foundry cut gears.

MYRTLE GROVE, Plaquemine, La. SF main gears and pinions, 1960.

CALDWELL SUGARS CO-OP, Thibodaux, La., Mr. Victor J. Bailliet, Factory Mgr. Four mills driven by SF cut gears.




GLENWOOD, Napoleonville, La., Mr. L. Suarez, Engineer. Housing, bedplates, cut steel gears by Service.



DUHE & BOURGEOIS, Jeanerette, La., Mr. C. L. Blanchard, Engineer, Mr. J. P. Duhe. Steel housings, top caps, side caps, bronze quarter boxes, top and bottom boxes by Service Foundry.

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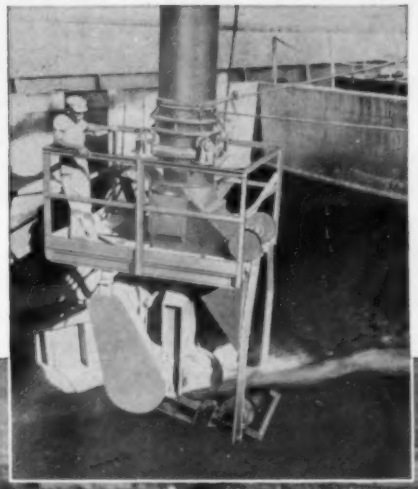

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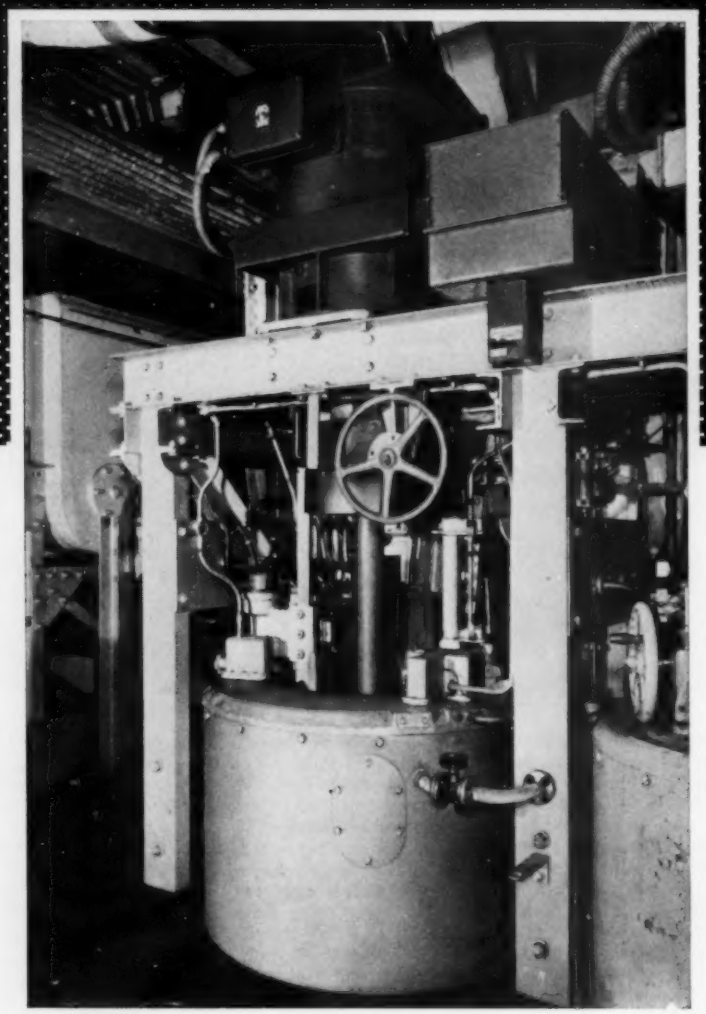

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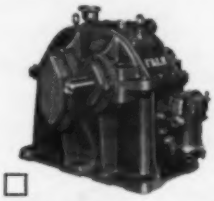

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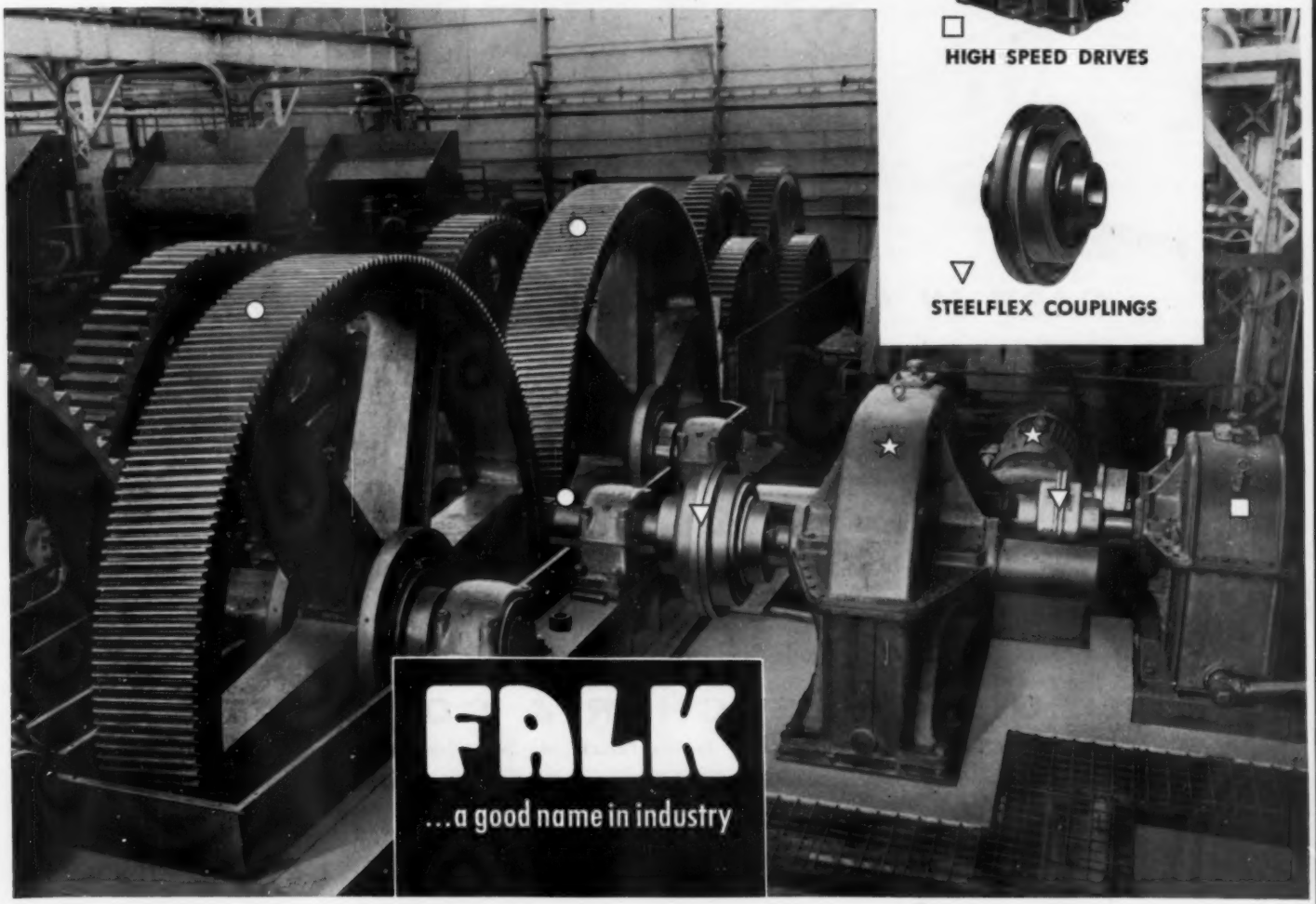

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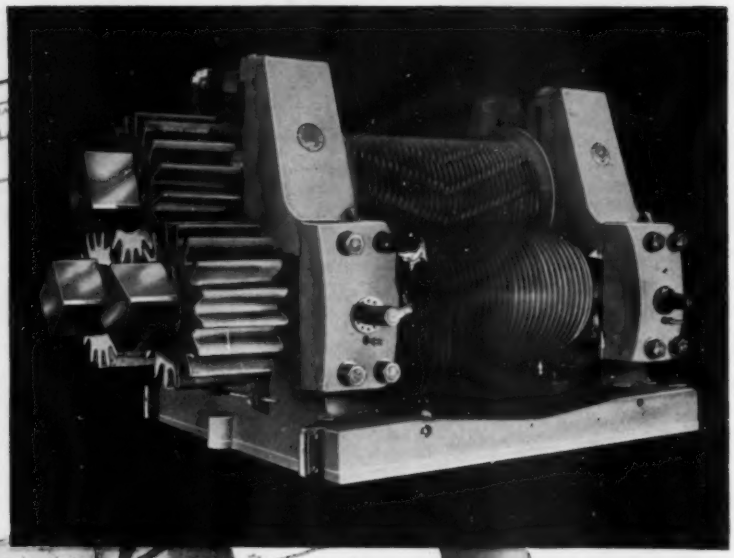

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*Important Report From Lawrence Myers*

SUGAR

FEBRUARY, 1961

# Sugar—Where Are We?

"GREAT danger is involved in delaying too long the extension of the Sugar Act" said Lawrence Myers, long-time Director of the Sugar Division of the U. S. Department of Agriculture in an address delivered to the New York Sugar Club on January 19, 1961.

While only a nine months extension is anticipated, to provide sufficient time for the Congress to work out longterm legislation appropriate to the new conditions facing the sugar industry, delay in passing such an extension might have serious consequences, said Mr. Myers.

In a highly significant talk, Mr. Myers reviewed the events of the past year and complimented the sugar trade on the manner in which it had met several critical situations during 1960.

Mr. Myers said:

"If world conditions were normal, thinking persons now would have to 'Stop, Look and Listen.' During the past five years world sugar production has expanded at an annual rate of close to three million tons or six percent. This is around three times the rate at which world population has expanded. Fortunately living standards have also risen and increases in per capita sugar consumption have enabled the world to absorb most of the increases in production.

"However, let us not beguile ourselves. Recent increases in world production have not been entirely in response to the demands of the world free market. A large part of this increasing production has been for protected markets. Again and again we hear the old familiar cries of 'national self sufficiency' or 'national self sufficiency with a safety margin' or 'national self sufficiency with a surplus for foreign exchange.' In the past these objectives have helped to bring about overproduction, low prices and even economic disaster."

In normal times, Mr. Myers continued, it would have been the responsibility of the sugar community to warn producers of the dangers of overproduction and the International Sugar Council would have been expected to take action. But, with one-third of the world's sugar production under Communist control Russia and China can play havoc with the sugar supply and demand situation. At one moment, a Cuban official announces that Cuba will produce to the limit, drive world prices down and force competitors out of the world market; the next moment another Cuban official states that practically the entire Cuban output will be consumed in the Soviet Union and Red China. The world is threatened not only by the possibility that Cuban production might be consumed in Communist countries but also by the danger that managerial incompetence and ineptitude will cut Cuban production.

Under these circumstances we would hardly have the right to urge nations to abandon programs of self sufficiency in sugar nor would these nations heed us. Hence sugar production is on the increase both on the world front and on our own domestic front.

In sketching in the background against which the Congress will have to undertake new sugar legislation, Mr. Myers emphasized that the domestic sugar program had been a success, in fact, the most satisfactory of all our agricultural programs. Therefore there will be a strong tendency to continue the program in substantially its present form. This, however, should not blind the industry to the need for reexamining the sugar program.

In a highly significant reference to such problems as those posed by pressure from new beet growers to participate in acreage allotments when these are re-established, the desire of the beet industry to build new producing facilities and like problems, Mr. Myers said:

"Some strong economic pressures have developed under the program. It would be a sorry mistake for the industry to urge Congress merely to sweep these under the rug. If such an attempt should be made I dare say we may discover some of the problems can bite.

"Government should not be asked to settle all of the problems and disputes arising from pressures within the industry. Rather, I suggest that the industry adopt a do-it-yourself program. You know your own problems, the stresses and strains that exist, the compromises that must be made if a program for your industry is to be written into legislation or administered successfully. . . . The alternative to settling problems within the industry is rather foreboding . . . The industry should assume the major responsibility for developing these solutions."

Mr. Myers suggested that perhaps never again would this country depend on a single country for sugar to the extent that we have depended on Cuba in the past. If we turn to numerous other sources, it will be necessary for these countries to perform the function that Cuba has done for so many years. Cuba produced and stored huge supplies that it could and would sell to the United States at any time. Cuba adopted a policy of selling sugar to this country when it was needed and not just when it was convenient for Cuba to sell or ship. Those who aspire to replace Cuba, said Mr. Myers, should give consideration to the extent to which they are able and willing to perform these functions.

"Undoubtedly there will be a desire," said Mr. Myers, "to reserve some quota for Cuba in the event it again becomes a friendly and dependable source of supply. A decision will be needed as to how much quota should be reserved for Cuba and how it can be reserved effectively."

He questioned the soundness of proposals to extend the sugar act on a year to year basis until the situation in Cuba was clarified stating that little was to be gained by delaying compromises necessary for satisfactory legislation including a decision in regard to the size of any reserve for Cuba and the method of holding such reserve.

In conclusion, Mr. Myers said:

"If there is to be a major shift in our sources of supply and if the new suppliers are to produce and carry adequate supplies for this market they must be informed of their responsibilities as quickly as possible. Also, they must be given assurances that they will be permitted to sell the supplies they produce and carry for this market."

# Officers & Committee Chairmen

*G. E. Waring, President*
**Atlantic Sugar Refineries, Ltd.,**
**St. John, N.B., Canada**

The group pictured on these pages, officers, committee chairmen and executive committee of the Sugar Industry Technicians, will meet on Sunday May 7th. as the opening event of the 20th. Annual Meeting of the organization. Following the business meetings of the various groups, all members and their wives are invited to attend a Sunday afternoon reception. The following two days will be devoted to delivery and discussion of thirteen technical papers of importance to the refiners and beet processors who will attend from the United States and several foreign countries. A final session will feature a symposium on current technical problems. The annual banquet will be held at the meeting place in the Sheraton Atlantic Hotel in New York. Members are urged to get in touch with any of the officers pictured in this article regarding details of the meeting.

Left
*A. D. Hinrichs, First Vice President*
**Refined Syrups and Sugars, Inc.,**
**Yonkers, N. Y.**

Right
*H. J. Jacobs, 2nd Vice President*
**South Coast Co., Houma, La.**

# Organizing 20th. Annual S I T Meeting

(1)

(2)

(3)

(4)

(5)

(6)

(7)

*1—E. W. Harris, Executive Secretary*
S.I.T. Inc.
150 Nassau St., New York 38, N. Y.

*2—A. V. Moeller, Secretary-Treasurer*
S.I.T. Inc.
150 Nassau St., New York 38, N. Y.

*3—A. G. Sieland, Chairman Exec. Committee*
Pepsi Cola Sugar Refinery,
Long Island City, N. Y.

*4—W. A. Bemis, Executive Committee,*
Revere Sugar Refinery
Charlestown, Mass.

*5—H. J. Reichie, Exec. Com. and Chairman of Publishing Committee*
Refined Syrups and Sugars, Inc.,
Yonkers, N. Y.

*6—F. W. Schwer, Exec. Com. and Chairman of Honorary Awards Committee*
National Sugar Refining Co.,
P.O. Box 3637, Philadelphia 25, Pa.

*7—E. J. Culp, Immediate Past-President and Chairman of Program Committee*
American Sugar Refining Co.,
120 Wall St., New York, N. Y.

*8—Fred Bruder, Chairman of By-Laws Committee*
American Molasses Co.
280 Richards St., Brooklyn 31, N. Y.

*9—E. Dwight Gillette, Chairman of Symposia and Nominating Committees*
Refined Syrups and Sugars, Inc.,
Yonkers, N. Y.

*10—Donald K. Luke, Jr., Chairman of Auditing Committee*
Suchar Sales Refining Co.,
Long Island City, N. Y.

(8)

(9)

(10)

# The Distribution Of Lost Time

## *A Suggested Approach Through The Concept Of "Loss of Tonnage".*

**C. C. Redman**

PROVIDED the boiling house of a raw sugar mill is of ample capacity at all stations to handle the maximum milling ability, and provided also that there is no need to slow the mills down, due either to problems in cane transport or in ability of the fields to supply the required cane tonnage, then, and then only, is the reporting of lost time as a percentage of total time meaningful and the distribution of this charge to various units of any real value.

These provisos, these ideal conditions of operation are not and cannot be met in practice simply because, irrespective of the possibility of so designing a factory to be "balanced," nevertheless this possibility can only exist for one, and only one, specified condition.

Since equipment must be designed for average conditions it is obvious that any change in this specified condition affects the output of the particular unit. The raw material, cane, being handled is essentially highly variable in composition and since throughout is traditionally measured in this unit value and compared to time to express capacity then it goes without saying that capacity must of consequence be also highly variable.

While the above is basic and elementary thinking on the subject, yet it is frequently forgotten and, we have had, to resort to the vague expression of "normal" or "nominal" capacity for giving some idea of the possibility of throughput in order to cover our inability to express in numbers the true existing capacity.

Usually the expression of normal capacity refers primarily to the milling unit or units without reference to house capacity, and as long as this is understood there is little fault to find with the expression. Under usual operating conditions, the milling plant is perhaps the least affected in its overall throughput by changes in cane quality. By this statement it is not meant that quality has no effect on mill throughput since we are all aware of the effect of trash, the effect of fibre quality and quantity and a variety of other factors, not well defined but included under the general term of "millability." What is meant, however, is that these various factors are usually constant day by day at any particular mill, hence the overall effect for the particular mill, is not of great consequence.

This being the case, we are justified in setting the standard milling capacity for the particular mill basing our standard on experience. In the boiling house the picture is quite different and the effect of varying juice quality is pronounced. Here we are unable to refer to any normal or nominal capacity unless things are so designed as to handle the optimum mill capacity under the least favorable conditions of juice quality.

Unless this optimum condition of house design is met then the normal capacity definition is meaningless. Without an accurate knowledge of house capacity related to mill capacity on the one hand and field and transport capacity on the other hand, it becomes extremely difficult, if not impossible, to analyze the loss of throughput with the end in view of providing ways and means for betterment of operations in the future.

It is the purpose of this paper to provide such a means of determining variation in house capacity and assigning preferentially the loss of milling capacity to respective departments. The departmental estimate of loss, for purpose of analysis, may then be broken down percentagewise by means of actual lost time charged against the various units in the department.

The basic concept in the proposal is "Loss of Tonnage" or briefly LT. This is defined:

"Loss of Tonnage (LT) = Maximum Tonnage (MT) — Actual Tonnage Ground" where the Maximum Tonnage (MT) is a calculated figure based on certain fixed standards defined precisely for the particular factory.

Inasmuch as the proposal under consideration contemplates primarily those instances in which known milling capacity is in excess of house capacity it is strictly, for this purpose, not usually necessary to define accurately the standard milling capacity.

In the case, however, of a multiple tandem house which has a normal milling capacity of, let us say 15,000 tons cane per day and a variable house capacity of let us say 10,000 to 16,000 tons cane per day and, assuming that under some extraordinary imposed condition that the factory is called on to operate before the usual overhaul of all tandems is completed then it would obviously be unfair to calculate Loss of Tonnage (LT) either on the capacity figure of 15,000 TC for the mills or on a calculated Maximum Tonnage (MT) based on house capacity, if in effect the tandems actually in operation had a capacity not exceeding say 9,000 tons cane per day.

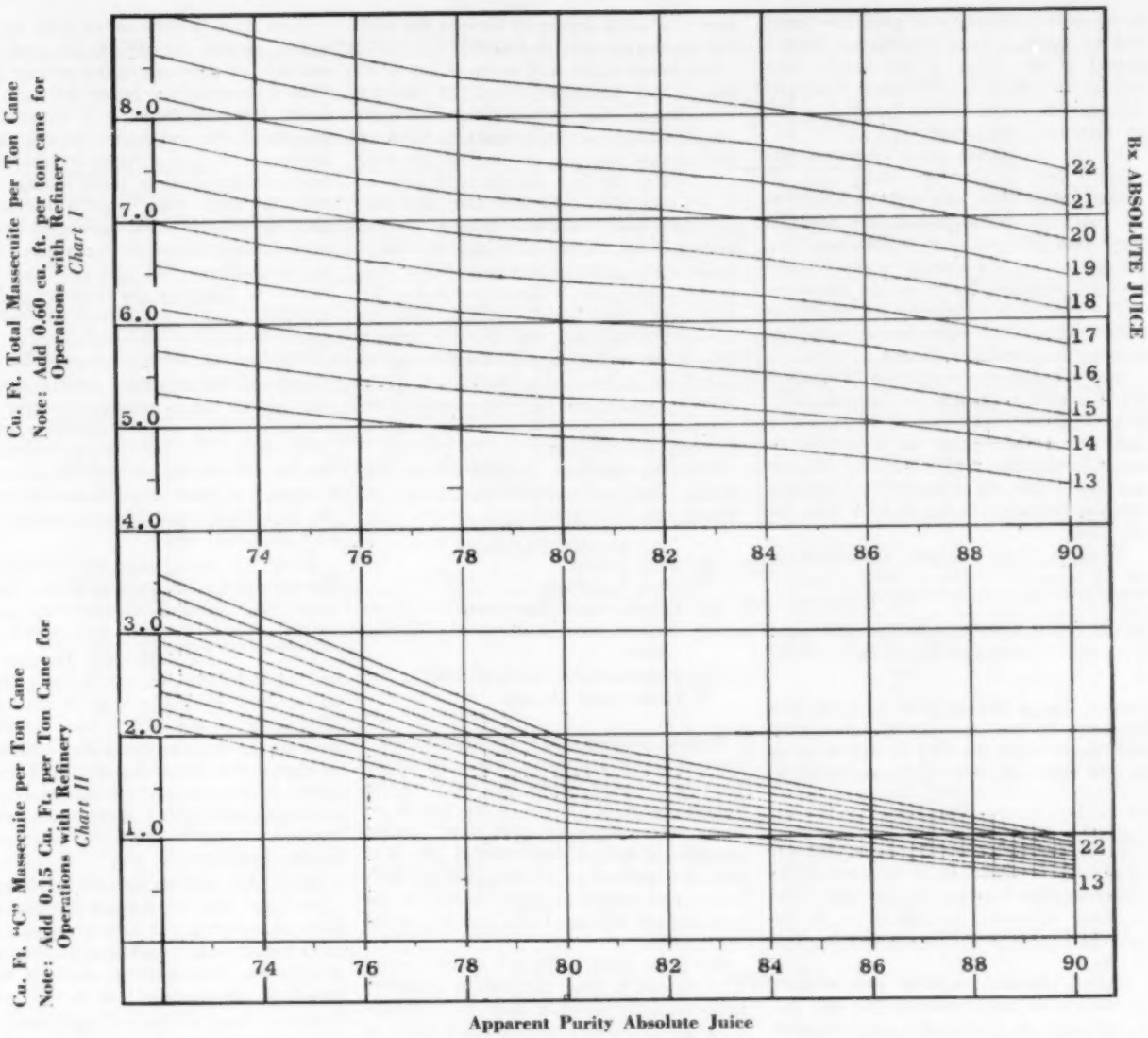
Therefore, in order to cover such eventualities it is proper to assign standard rates to the milling tandem or tandems. This standard rate is best assigned on the basis of experience. The writer knows of no formula applicable to all mills which will more precisely indicate capacity other than that derived through experience.

Any station in the boiling house is, of course, capable of creating a bottle-neck. The same is true of any equipment unit in any of the various stations and it is apparent that, for instance, if our heater pump is under capacity that irrespective of heater capacity we are unable to grind up to capacity. It has to be assumed that the house in any of these respects is properly engineered.

There are however, certain stations that have widely varying capacities which are greatly influenced by juice quality rather than by juice quantity.

These stations are the vacuum pans and the centrifugals, especially the low grade centrifugals. Other stations, such as evaporators, are affected mainly by quantity rather than quality and we may include here also the clarification although while influenced by both quality and quantity it is not possible to give absolute values to the effect of quality variation.

Generally speaking, we will confine remarks on house capacity to the capacity of the pans and the low grade centrifugals since it is at these stations, at the factory at which the observations were made and charts plotted, that bottle-neck conditions existed. Other stations at this particular factory were adequate to cope with rates in excess of the possibilities of the pans and low grade centrifugals.




**Procedure for Estimating Maximum Tonnage—MT**

**(1) Determine Total Massecuite/TC**

**(2) Determine "C" Massecuite/TC**

**(3) Total Mass/TC less "C" Mass/TC = A & B Mass/TC**

**(4) Pan Vol per TC for A & B = A & B Mass/TC × 0.147**

**(5) Pan Vol per TC for C = C Mass/TC × 0.245**

**(6) Addition of (4) and (5) = Total Pan Volume Reqd. per TC = $p^v$**

**(7) Then MT pans = $\frac{\text{Actual Pan Vol.}}{\text{Reg'd Pan Vol/TC}} = \frac{16{,}000}{p^v}$**

**(8) MT and "C" Centrifs = $\frac{\text{Centrif Capacity Cu. Ft./Day}}{\text{Cu. Ft. "C" Mass/TC}} = \frac{22{,}000}{\text{Cu. Ft. "C"/TC}}$**

While the pans and low grade centrifugals are here discussed, it is evident that other stations, such as evaporators for instances, may be assigned standard capacity rates and the reader can easily see how this may be done since effect of capacity is more closely related to quantity input.

Before we can estimate the potential of these stations in tons cane per day, we must, first of all, estimate the amount of massecuite that must be handled, and, by assigning fair values to the ability of our equipment to handle these quantities, we can determine potential capacity in terms of tons cane per day.

Consider for instance centrifugals capable of handling say 10,000 cu. ft. of low grade massecuite per day, then if the juice is of such a quality to yield 1.0 cu. ft. "C" massecuite per ton cane the potential of this station is 10,000 tons cane per day. On the other hand, if the juice quality yields 2.0 cu. ft. "C" massecuite per ton cane then the potential capacity drops to 5,000 tons cane per day.

Similarly for the pans. Assume juices of different characteristics but both yielding seven cubic feet total massecuite per ton cane: in case A assume one cubic foot per ton cane "C" massecuite and thus six cubic feet of A&B massecuite while in case B we obtain two cubic feet per ton cane of "C" and thus five cubic feet of A&B massecuite. It is obvious that since the required boiling time for "C" massecuite is much greater than for A&B massecuite, that with equal pan capacity the potential on the pans is less in case B than in case A.

It is therefore essential that we be able to estimate massecuite production with some degree of accuracy if we are to estimate potential capacity of pans and centrifugals.

Chart 1 presumes to do just that and refers massecuite production as a function of Bx and purity of the extracted juice. The chart was plotted by a combination of theoretical considerations and the actual

measurement of massecuite quantities under widely varying juice conditions over a period of two years at the factory with which the writer is associated. Generally speaking, the three-boiling system is in use at this particular factory.

By the use of this chart the massecuite volumes per ton cane are easily read off. While these values are with reference to the particular factory noted, it is felt that they may be used with confidence even though it may be necessary to apply a percentage correction factor for use by others.

The chart lists corrections for operations with refinery and this obviously applies only to the particular factory.

Also listed in the caption is "Procedure for Estimating Maximum Tonnage MT/Day." This too applies only to the particular factory but calculation for any other is easily carried out. Steps (1) (2) (3) are self explanatory. In steps (4) (5) the pan volumes per ton cane are derived from the equation:

$$\text{Required Pan Vol per Ton Cane} = \frac{\text{Cu Ft Mass/TC} \times \text{Hrs to Boil}}{24}$$

In the case of A&B massecuite with factor 0.147 this is derived by $\text{Hrs to Boil} = 0.147 \frac{}{24}$ whence Hrs to Boil is given as 3.528 Hrs. Similarly in the case of "C" massecuite with factor 0.245 the Hrs to Boil is given as 5.88 Hrs, e.g., $\frac{5.88}{24} = \text{Factor} = 0.245$.

These standard boiling hours for the various massecuites may be assigned at the best discretion bearing in mind the usual practices followed, the efficiency of the pans, and other variables peculiar to each factory.

Having obtained required pan volumes for the various massecuites in (4) and (5) we add and so obtain, the total required pan volume per ton cane as in (6) and denoted $P^v$.

The maximum tonnage (MT) is then given by $\frac{\text{Actual Pan Volume.}}{P^v}$ In the chart example the actual pan volume is given as 16,000 cu. ft.

For estimating the MT on centrifugals we need only:

$$\text{MT} = \frac{\text{Centrifugal Capacity Cu Ft per Day}}{\text{Cu Ft Mass Per Ton Cane}}$$

In the chart example the MT on "C" centrifugals is given as $\frac{22{,}000}{\text{Cu Ft "C" Mass/TC}}$ where 22,000 = the centrifugal capacity Cu Ft/Day.

By preferential treatment of loss of tonnage we mean the distribution of the tonnage lost, in some preferential manner decided on beforehand as being fair and equitable to all departments concerned. This is occasionally, if not frequently the source of much argument between the mill, the fabrication and the field.

For instance, the mill engineer has need, though not immediate need, of shutting down the mill for necessary repairs requiring several hours. Opportunity is taken of an expected shortage of cane in the mill yard due to the fact that the next delivery is not scheduled until sometime later and he would in any case have to slow down to meet delivery. At the same time the fabrication supt. takes the advantage of the stop to boil out a set of evaporators. For the field man, rains have interfered with his harvest for the day, yet there is enough cane if the traffic can put on extra runs to pick it up at the loading stations. In cases like this, some preferential treatment of the lost time and consequent loss of tonnage is the only fair solution.

We have therefore, decided on the following sequence or preferential order for distributing loss of tonnage:

(a) Mills proper
(b) Cane handling
(c) Factory other than above
(d) Outside reasons connected with factory
(e) Transportation—lack of cane
(f) Fields—lack of cane

For the purpose of the manufacturing report, A-B-C-D are reported as chargeable to factory insofar as loss of tonnage is concerned. For final analysis of this loss in respect to the individual units of equipment, recourse is had to the recorded lost time and, the percentage of time lost on each unit is proportioned accordingly against the total loss of tonnage (LT) charged to the department.

The main value of the procedure is mostly evidenced in those factories of relatively large capacity drawing their cane supply from widely varying sources susceptible to extreme quality characteristics. If at the same time milling capacity is generally in excess of house capacity the knowledge of house capacity is the only way of knowing the loss that may be occasioned through inadequacy of the cane supply.

The expression of this loss in numbers, e.g., tons of cane, is a much more satisfactory means than doing so by expression in terms of hours lost if in effect the mill lost time at periods when the house could not have handled more tonnage. On the other hand, the mill might have reduced its grinding rate to accommodate the cane supply when in effect the house could have handled more tonnage. In the first case it would have been unfair to charge the fields with the lost time and in the latter case it would be equally unfair not to have done so.

The work sheet for carrying the loss of tonnage is shown in Exhibit I. Generally the tabulation is self-explanatory, but some entries call for an explanation.

Lines 1 to 4 have to do with the particular factory for which the need arose and are not pertinent to the present paper. With a three tandem house operating practically the year round, it is impossible to do all of the necessary repairs on all tandems during a very short idle season, hence repairs must be made during operations in crop. Such repairs during the grinding season cannot obviously be considered a loss of time in operations. Hence, we have coined the phrase "Operational Hours" to designate the time available for operations to distinguish from the time non-operational due to seasonal repairs.

This concept is also extended to cover anticipated and extended interruptions on any tandem due to conditions beyond control and making a three tandem operation unnecessary. The overall operations are thus better defined by the expression of Operational Hours % of Total Hours and the Lost Time in operations expressed as % of Operational Hours.

Lines 1 to 4 inclusive, may therefore be disregarded for the purpose of this presentation and we shall consider only lines 5 to 15.

Line 5 is the Maximum Tonnage MT calculated for the pans and "C" centrifugals as indicated on chart and in the text above. The lower of the MT is used whichever may be the case, provided that such figure is higher than the actual grind. When the actual tonnage ground exceeds or is equal to the calculated MT there is no loss of tonnage LT and hence the MT is put equal to the actual grind.

Lines 6-7 and 8 are self explanatory. Line 9, the "Corrected hours lost excluding lack of cane" is the actual reported lost time for all causes excluding lack of cane, divided by the number of tandems operational, in the example 3 or 2.

Lines 10 and 11 are self explanatory and line 12 is the corrected time lost due to traffic treated in line 9. Lines 13, 14 and 15 complete the record and are self-explanatory.

At the particular factory from which the example is taken, it has been found practical to boil-out evaporators on-the-run provided that the weekly grind does not exceed 75,000 TC. Since the MT is an estimate of daily potential, the weekly potential or reconciliation must be adjusted to allow for such loss of tonnage as may be occasioned through the need to shut down or slow down for this operation. The footnote explanation is self explanatory and the corrected figures, if necessary, for this reconciliation are shown under the "Week" column replacing those obtained by addition of the daily figures.

In Exhibit I is shown example of recording. It should be noted that no negative numbers are allowable. For example: On day 80 the result in Line 13 would have yielded 932 thus resulting in a —275 for

EXHIBIT 1 UNIT SHEET LOSS OF TONNAGE Week No. From Ending

| DATE CROP | | DAY | 80 | 81 | 82 | 83 | 84 | 85 | 86 | Week | Previous | Todate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Mill Operational Hrs Reported | 72 | 72 | 72 | 72 | 72 | 48 | 48 | 456 | 4,740 | 5,196 |
| 2 | | Mill Non | - | - | - | - | - | 24 | 24 | 48 | 948 | 996 |
| 3 | 1 + 2 | Mill Total Hours | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 504 | 5,688 | 6,192 |
| 4 | 1 ÷ 3 | Operational Hrs % Total Hrs | 100 | 100 | 100 | 100 | 100 | 66.7 | 66.7 | 90.5 | 83.3 | 83.9 |
| 5 | | Maximum Tonnage Calculated | 13,400 | 15,000 | 12,000 | 15,000 | 14,000 ~~12,000~~ | 12,000 ~~12,000~~ | 12,000 ~~12,000~~ | 93,400 | 1,027,000 | 1,120,400 |
| 6 | | Actual Tonnage Ground | 12,000 | 10,000 | 11,000 | 8,000 | 14,000 | 10,000 | 9,000 | 74,000 | 790,000 | 864,000 |
| 7 | 5 - 6 | Loss of Tonnage | 1,400 | 5,000 | 1,000 | 7,000 | None | 2,000 | 3,000 | 19,400 * | 237,000 | 256,400 |
| 8 | 5 ÷ 24 | Maximum Tonnage Rate/Hr | 558.3 | 625.0 | 500.0 | 625.0 | 583.3 | 500.0 | 500.0 | 556 * | 542 | 543 |
| 9 | Report ÷ 3 | Corr Hrs Lost Excluding Lack Cane | 1.33 | 2.00 | 2.50 | 0.33 | 0 ~~2.00~~ | 1.50 | 1.00 | - | - | - |
| 10 | 9 x 8 | Loss Tonnage Excluding Lack Cane | 743 | 1,250 | 1,000 ~~1,250~~ | 206 | 0 ~~1,166~~ | 750 | 500 | 4,449 * | 48,000 | 52,449 |
| 11 | 7 - 10 | Loss Tonnage Due Lack of Cane | 657 | 3,750 | 0 | 6,794 | 0 | 1,250 | 2,500 | 14,951 * | 189,000 | 203,951 |
| 12 | Report ÷ 3 | Corr Hrs Lost Lack Cane - Traffic | 1.67 | 2.25 | 0 ~~0.6~~ | 1.00 | 0 | 0 | 0 | - | - | - |
| 13 | 12 x 8 | Loss Tonnage Lack Cane - Traffic | 657 ~~932~~ | 1,406 | 0 | 625 | 0 | 0 | 0 | 2,688 * | 24,000 | 26888 |
| 14 | 11 - 13 | Loss Tonnage Lack Cane - Fields | - | 2,344 | 0 | 6,169 | 0 | 1,250 | 2,500 | 12,263 * | 165,000 | 177,063 |
| 15 | 7 - 11 | Loss Tonnage - Factory | 743 | 1,250 | 1,000 | 206 | 0 | 750 | 500 | 4,449 * | 48,000 | 52,449 |

WEEKLY RECONCILIATION

| | | |
|---|---|---|
| MT From Chart x 7 = MT Week | 93,400 | |
| Less Deduct Week End Cleaning | None | (Note A) |
| Corrected MT for Week | 93,400 | Enter in Line 5 - Week Column: Recalculate Week COLUMNS MARKED * |

None required since tonnage ground is less than 75,000 TC

Note A: Deduct 7000 TC for Week-end cleaning if by so doing the MT for week is not reduced to less than 75,000 TC. Otherwise deduct correspondingly lower TC.

Line 14. Hence Line 13 is corrected as shown to 657 thus giving zero for Line 14.

Again, if the actual tonnage ground exceeds the maximum tonnage MT calculated, we would result with a negative loss of tonnage. In such cases the MT is put equal to the actual tonnage ground and no loss of tonnage results, e.g., day 84.

On days 85 and 86 in the example is shown the procedure for handling matters when all mills are not "Operational." On those days it has been decided that, say, due to heavy rains and loss of field labor it is improbable that cane deliveries during the next week or more would warrant a three tandem operation and it has been decided to stop operations entirely on one of the tandems.

This decision results therefore in a two tandem operation with 2 x 24 or 48 operational hours per day and 24 non operational hours per day. The house is now able to handle in excess of the two tandem capacity which is nominally 12,000 TCD. Therefore, even though the MT is calculated at 14,000 TCD the figure of 12,000 or the MT on the two tandems is used instead.

## Summary

With house capacity in excess of mill capacity under all conditions the so called nominal capacity of the mill may be accepted at face value, and if the mill is grinding at maximum rate at all times then the definition of lost time as a percentage of total time available is the true indication of the potential loss of throughput due to stoppages and the stoppages due to any of various causes can be accurately defined.

These conditions are seldom met with in practice and it is more common to find unbalanced houses than it is to find balanced houses, since it is an inherent characteristic of the cane supply to be variable in character from lot to lot and as the season progresses. Since equipment can only be designed for a specified condition it follows that capacity potential changes with change in cane quality.

Considering only those stations which are affected in their potential by quantity changes per unit of cane with varying juice quality, (although obviously standards or targets can also be set for stations otherwise affected by other variables, e.g. the effect of maceration on evaporator capacity) a standard chart has been prepared from which the output of massecuite per TC may be estimated by reference to the Bx and purity of the juice being handled.

From this is derived the house potential capacity by applying realistic values for capacities based on experience.

Thus knowing the potential or maximum tonnage MT, we arrive at an estimate of the loss of tonnage LT by deducting the actual tonnage ground from the calculated maximum tonnage MT.

This loss of tonnage is treated preferentially and charged to the three main departmental groups of field, transport and factory. Departmental subdivision may be accomplished, if so desired, by application of percent of lost time charged to the various units in the department.

Advantage of the concept of loss of tonnage accrue through possibility of defining numerically in the familiar units of tons cane the actual loss of tonnage not based on the vague term of nominal capacity but on a more realistic and accurate estimate of capacity influenced by variable cane quality.

Graphic representations of the loss of tonnage are most valuable for analysis of problems and as a ready means of reference.

■

## Char Tests Discussed At Zerban Lunch

"Interpretation of Laboratory Tests on Bone Char" was the subject of a highly stimulating talk delivered by Dr. Frank G. Carpenter of the Bone Char Research Project, National Bureau of Standards at the Zerban Sugarmens' monthly luncheon on January 11th. The meeting was held at the Chemists Club in New York and an unusually large number of refinery technicians attended. In the ensuing discussion the point was established that many of the conventional tests have far less significance than has been attributed to them.

■

## Frank L. Harvey

With regret the death of Frank L. Harvey on November 12, 1960 is recorded. Mr. Harvey served for many years with the Philadelphia refinery of National Sugar Refining Company. He is survived by his wife Frieda B. Harvey of Lexington, Michigan.

*Sugar's Progress in*

# HUMAN RELATIONS

Roy J. Leffingwell

## Importance of Productivity to Sugar Management

For the third consecutive year we present on this page figures showing annual productivity and hourly wages of U. S. sugar areas.

Productivity is a major element in sugar management today. It may be the most troublesome factor you have to deal with in the not-too-distant future, so it deserves study.

It was obvious that the industrial revolution would force all agricultural practices into change. However, it is not until the oxen and the mule give way to power-driven machinery that sugar production becomes a business as well as a craft.

Power machinery requires a different type of management. Machinery is expensive to buy, operate and maintain. It requires a different type of skill to handle machines than to plow with oxen.

Until comparatively recent times sugar production in most areas was looked upon largely as a way of life. Most growers continued to produce sugar because their fathers grew sugar, and they knew no other way of making a living. Today, it is different.

Men having the skill to operate power machinery, have the ability to make a living in many other ways. Therefore, to keep them producing sugar requires an increase in what they get out of the sugar job. This means more money—and other things such as: an opportunity for achievement; recognization for the work they do; a type of job that is satisfactory; responsibility and a chance for advancement.

These may sound like fancy demands for men driving tractors, but scientists have put a great deal of study into what makes a man work, and these are the things that most men require to be satisfied in a job. And, if your tractor driver isn't satisfied, he will probably get a job elsewhere.

Let's talk about the first request the machine operator will likely make—more money. Probably the only way you can pay him more money is for him to produce more. This means increased productivity. Productivity is most efficiently increased by new and better machines and greater skills of operators and maintenance men. Hard work, alone, won't cut down the man-hours per ton of sugar very much in this age of power equipment.

More and better machines cost money. And, more skilled and efficient operators and maintenance men are expensive. This is why a high degree of management skill and knowledge of productivity is required in today's sugar industry.

A balance must be reached between what men and machines cost and what they produce. Looking at U. S. sugar productivity figures, we see that Puerto Rico hires men for 50½¢ per hour, plus two to four cents for fringe benefits. Hawaii pays $1.629 per hour, plus .477¢ for fringe benefits. (53½¢ compared to $2.10½ in round figures.)

However, it takes more than five times as many man-hours to produce a ton of sugar in Puerto Rico than in Hawaii. And, Hawaiian wages are not five times higher.

Which area is doing the best management job? We can't answer the question without knowing how much Hawaii spends for machines and how much Puerto Rico spends for machines. These figures are not available.

Productivity is a major factor in sugar management today. It will be more important tomorrow, when new demands are made for higher wages—because it isn't what you pay, but what you get, that makes for profit or loss.

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Below is the annual productivity and wage figures for U. S. sugar producing areas for the period 1948-1959. Information is compiled by the U. S. Department of Agriculture and released in Sugar Reports, No. 101.

Man-hour requirements per ton of sugar declined during the year 1959 in all producing areas except Louisiana, where it increased. Weighted average earnings per hour for field workers increased in all U. S. sugar areas. Hawaii continues to lead all other with a straight-time wage of almost $1.63 per hour and additional fringe costs of more than 47¢ per hour. Puerto Rico continues to be the low wage area with hourly payments of 50½¢, plus fringe benefits valued at two to four cents.

**Field Workers Requirements**
**Sugar Producing Areas, 1948-1959 Crops**

| Crop Year | Louisiana | Florida | Hawaii | Puerto Rico[1] | Beet Area |
|---|---|---|---|---|---|
| | Man-hours per ton of sugar (raw value)[2] | | | | |
| 1948 | 113.42 | 59.94 | 30.56 | 140.82 | 40.80 |
| 1949 | 95.58 | 48.50 | 27.32 | 112.56 | 38.40 |
| 1950 | 78.02 | 42.56 | 25.86 | 109.78 | 36.00 |
| 1951 | 102.86 | 34.46 | 24.18 | 110.22 | 33.40 |
| 1952 | 66.28 | 26.38 | 23.00 | 112.58 | 33.00 |
| 1953 | 59.72 | 23.78 | 23.44 | 116.66 | 31.80 |
| 1954 | 56.50 | 24.74 | 21.06 | 100.48 | 33.80 |
| 1955 | 56.84 | 25.08 | 17.42 | 96.38 | 31.80 |
| 1956 | 48.82 | 22.58 | 17.30 | 91.20 | 31.40 |
| 1957 | 53.22 | 22.08 | 16.46 | 94.68 | 31.00 |
| 1958 | 47.52 | 22.04 | 18.02 | 98.10 | 30.60 |
| 1959 | 50.86 | 21.86 | 17.78 | 89.80 | 30.20 |

| Crop Year | Louisiana | Florida | Hawaii Earnings & Fringe Benefits | Puerto Rico[1] | Beet Area |
|---|---|---|---|---|---|
| | Weighted Average Earnings Per Hour of Field Workers[3] (dollars per hour) | | | | |
| 1948 | 0.414 | 0.669 | 1.134 | 0.346 | 0.816 |
| 1949 | 0.428 | 0.669 | 1.241 | 0.345 | 0.850 |
| 1950 | 0.444 | 0.667 | 1.284 | 0.349 | 0.888 |
| 1951 | 0.454 | 0.714 | 1.362 | 0.370 | 0.938 |
| 1952 | 0.493 | 0.842 | 1.455 | 0.393 | 0.939 |
| 1953 | 0.523 | 0.888 | 1.571 | 0.416 | 0.938 |
| 1954 | 0.550 | 0.880 | 1.711 | 0.439 | 0.940 |
| 1955 | 0.564 | 0.885 | 1.853 | 0.437 | 0.943 |
| 1956 | 0.629 | 0.914 | 1.917 | 0.453 | 0.945 |
| 1957 | 0.667 | 0.952 | 2.019 | 0.493 | 0.946 |
| 1958 | 0.692 | 0.984 | 2.044 | 0.503 | 0.948 |
| 1959 | 0.710 | 1.011 | 2.106 | 0.505 | 0.949 |

[1] Data are for the 1947-48 crop through the 1958-59 crop.

[2] Data include all labor utilized in the production of sugarcane or sugar beets (including supervision) other than administrative and employee services.

[3] Based on average hourly cash earnings of workers employed on time or piece work rate basis. In addition, workers receive non-cash benefits valued at two to four cents per hour except in Hawaii. Fringe benefits to workers in Hawaii are listed above.

Does a worker have property rights to his job? This is a basic problem worrying U. S. management in installation of machines to replace workers. And, it is a problem that is fundamental to mechanization of the sugar industry.

There is no agreement as to the correct answer to the question, which is posed whenever a machine takes the job of a worker. Obviously if workers do have property rights to their jobs, management must pay compensation when employees lose jobs because of this reason.

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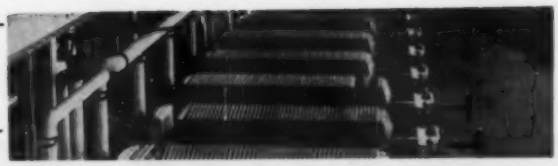
The head of the U. S. teamsters union made one of the most encouraging statements to be heard in a long time. He says automation may create temporary job displacement, but ultimately means more jobs for union members. If this concept is accepted by union leaders around the world it will be much easier to introduce machines into the sugar industry. However, there is no indication that any such views will receive approval by union leaders in many sugar areas.

# Personal press station



*Dr. A. J. Mangelsdorf receiving a commemorative book from George Y. Ewart, director of agriculture and hydrology for American Factors.*

**Dr. A. J. Mangelsdorf,** principal geneticist of the Experiment Station, Hawaiian Sugar Planters' Assn. retires in April upon the completion of 34 years of work with the Hawaiian sugar industry. In honor of his long and distinguished service to the sugar industry Dr. Mangelsdorf was recently presented with a book containing letters from internationally known sugar cane geneticists, and managers of all Hawaiian plantations.

**Edward B. Holroyde,** formerly manager of McBryde Sugar Company on Kauai in the Hawaii, has been named manager of Hawaiian Commercial & Sugar Company, largest sugar plantation in the United States, succeeding Asa F. Baldwin. A native of Winnipeg, Canada, Mr. Holroyde joined the Hawaiian sugar industry in 1934 and became manager of McBryde in 1959.

**Takeshi Yahata,** formerly senior accounting clerk of Hilo Sugar Co. is now with the C. Brewer & Co's subsidiary company in Iran, assisting in training Iranians in sugar accounting procedures. He will be away from the Hawaiian industry six to eight months.

**Arthur L. Ransohoff,** president of A. L. Ransohoff Co., Inc., was elected today to succeed himself as president of the New York Coffee and Sugar Exchange, Inc. **Earle T. MacHardy,** vice-president in charge of raw sugar purchases of Refined Syrups & Sugars, Inc., was re-elected Vicepresident, and **J. M. Clark,** Vicepresident of Anderson, Clayton & Co., was re-elected treasurer.

Elected to the Board of Managers of the Exchange, for a two-year term, were: J. A. Higgons, Jr., Charles Leister, Charles L. Van Elst, Emmet Whitlock, Charles W. Chapin, and J. J. Schwartz.

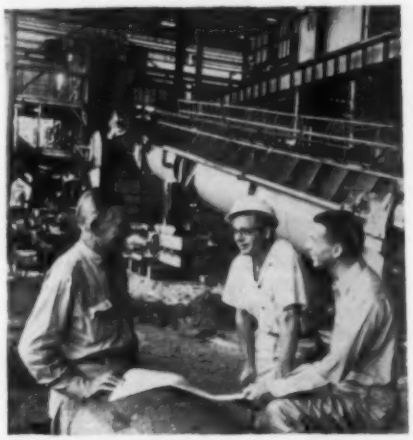
**Dr. H. W. Kerr** has resigned the Directorship of the Sugar Research Institute, Mackay, Queensland, Australia, to accept the post of Sugar Project Supervisor with Kuzestan Development Service at Ahwaz, Iran.

Wm. J. Westerman, Vicepresident of Henderson Sugar Refinery, Mobile, Alabama, announces the appointment of **Ernest Thublin** as Traffic Manager of Henderson effective January 1, 1961.

**Asa F. Baldwin** resigned as manager of Hawaiian Commercial & Sugar Company following an investigation by a company committee resulting from charges of poor management by an HC&S stockholder. The committee's report refuted most of the stockholder's charges but Mr. Baldwin asked to be relieved of his duties as manager so that he could devote more time to personal and family matters. He will continue as company president.

**James M. Marshall,** executive vice president of California and Hawaiian Sugar Refining Corp., Ltd., and director of Sugar Information, Inc., has been elected to the 1961 board of directors of the San Francisco Chamber of Commerce. Marshall spent 12 years with the U.S. Dept. of Agriculture and served as director of the USDA from 1946 through 1948. He also is chairman of the executive committee of the U.S. Cane Sugar Refiners' Association.

The final report on the feasibility of continuous sugar cane diffusion which appears on page 45 of this issue is illustrated by the equipment while being installed. **Charles H. McAlister,** superintendent of Kekaha Sugar Co., where the pilot plant was tried is seated at left discussing problems of installation with Ray Hammond of Silver Engineering Works (center) and George Appel of the HSPA Experiment Station.



# facts about sugar

NEW YORK, JANUARY 6, 1961: Premier Castro late in December claimed that the communists would buy four million tons of sugar from Cuba at 4¢ per lb. in 1961, if the U. S. continues to ban Cuban sugar. However, the 4¢ price is meaningless, in the opinion of B. W. Dyer & Company, Sugar Economists & Brokers, because it is largely a barter deal, and the Reds can put fictitious prices on the goods they ship to Cuba.

Russia is scheduled to take 2.7 million tons under this deal, but it is questionable how much of this can be used in view of her record-breaking beet crop. China, on the other hand, is slated to take one million tons, and probably could easily use that amount to help overcome her general crop failure. However, if 1960 is any criterion of events to come, it appears that Russia and Red China probably fell at least ½ million tons short of the 2.2 million tons they were committed to take from Cuba last year. Thus, it appears that the Cuban carryover on December 31, 1960 probably closely approximated the 1.3 million short tons reported at the end of 1959.

Castro also threatened to dump production in excess of four million tons on the world market, if countries supplying the U. S. boost their production. (The U. S. Department of Agriculture estimates 1961 Cuban outturn at 5.1 million Spanish long tons). However, production costs in Cuba have been estimated at 3.50¢ per pound, and, although workers will be paid only on the basis of a 2½¢ per pound price on the excess, it undoubtedly would be painful for Castro to dump sugar at low prices.

Trading in the new world (#8) sugar contract began on Tuesday, January 3, 1961, for deliveries in March 1961 and thereafter. The new contract greatly expands the areas of origin of world sugar outside Cuba. The #8 spot price on January 5th was 2.95¢ per pound, (f.o.b. and stowed) compared with a #4 spot quotation of 3.25¢ for sugar in Cuba. Trading in the #4 contract was suspended on January 6th, as a possible aftermath of the break in U. S.-Cuban diplomatic relations on January 3rd.

President Eisenhower on December 16, 1960 extended the ban on imports of Cuban sugar through March 31, 1961. He also stated that when Congress convened, he would again recommend that Dominican sugar be barred from replacing Cuban sugar. Later that afternoon, the Department of Agriculture determined that U. S. sugar requirements for 1961 were 10,000,000 short tons, raw value, and established quotas of 1,675,701 tons for the first quarter. Cuban replacement purchases, amounting to 824,299 tons of non-quota sugar, finally were authorized December 22nd, and were as follows (in short tons, raw value):—Dominican Republic 222,723; Peru 215,000; Mexico 191,168; Philippines 122,683; Nicaragua 16,000; Taiwan 11,505; Brazil 11,474; Br. West Indies and Br. Guiana 10,168; Colombia 6,000; Ecuador 6,000; El Salvador 2,000; Guatemala 2,000; Costa Rica 1,508; Panama 1,505; Netherlands 1,463; Canada 1,266; U.K. 1,034; Haiti 433; Belgium 361; and Hong Kong 8. The Dominican sugar must pay an entry fee of 2.25¢ per pound compared with 2¢ in 1960, but it is profitable for this sugar to enter, based on the #8 world price. It was rumored that most of the Dominicans were sold early in January on a price-date-of-arrival basis. Countries generally receiving authorizations of less than 2,500 tons will be able to ship direct-consumption sugar.

**Sugar Prices—January 6, 1961**

| | |
|---|---|
| **Duty Paid Bulk (#7)** | |
| **Raw Sugar N.Y.** | **6.41** |
| **Average #7 Raw Sugar Jan. 1 to Jan. 6** | **6.41** |
| **Refined Sugar Gross N. Y.** | **9.55** |
| **#8 Raw Sugar (f.o.b. and stowed)** | **2.95** |
| **Average #8 Sugar Jan. 1 to Jan. 6** | **2.95** |

| *Futures Prices* | *Contract #8* | *Contract #7* |
|---|---|---|
| **March 1961** | **3.00** | **6.39** |
| **May 1961** | **2.99** | **6.40** |
| **July 1961** | **2.97** | **6.45** |

The #7 (domestic, duty paid, bulk) spot price remained at the 6.41 level during most of December and early January, but futures prices advanced slightly. The rumored sale of the Dominican raws, the severance of diplomatic relations with Cuba, and trouble in Laos may also have contributed to the firmness in futures.

National and American announced, effective after December 30, 1960, that they were withdrawing the $.15 allowance on all industrial grades in 100 lb. bags on sugars delivered f.o.b. from New York and Philadelphia refineries and in the New York and Philadelphia Metropolitan areas; making the basis price for 100 lb. bags of fine granulated $9.55. Sucrest's basis price for 100 lb. bags advanced to $9.45.

Chairman Cooley (D., N. C.) of the House Agriculture Committee early in January stated that he would introduce legislation that week extending the present Sugar Act, which expires March 31st, through 1961. The bill would not contain Presidential authority to cut off purchases from the Dominican Republic, but President-elect Kennedy's opinion on this undoubtedly will be given great weight in the final legislation. It was reported that the bill would not be considered by Congress until after January 20th.

The Organization of American States on January 4th voted a partial economic embargo against the Dominican Republic. The U. S. State Department, however, was reported to oppose the imposition of a total embargo and also any attempt to cut off purchases from the Dominican Republic through import restrictions, B. W. Dyer & Company points out.

## Single Sugar Union Discussed In Mexico

MEXICO CITY, JANUARY 4, 1961: A report from the El Mante sugar mill revealed that it will be grinding an average of 26,000 tons of sugar cane weekly. Management feels that there will be improved production in the cycle ending the middle of this year despite recent yield slumps.

The Department of National Economy also believes that Mexico's sugar industry is on verge of a new boom. Its figures show that in 10 years Mexico has tripled its production from 590,269 metric tons in 1950 to an estimated production of 1,700,000 tons in the 1960-61 cycle.

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On the management-labor front, aside from demands by cane workers who want a 10 pesos (80 cents) increase per delivered

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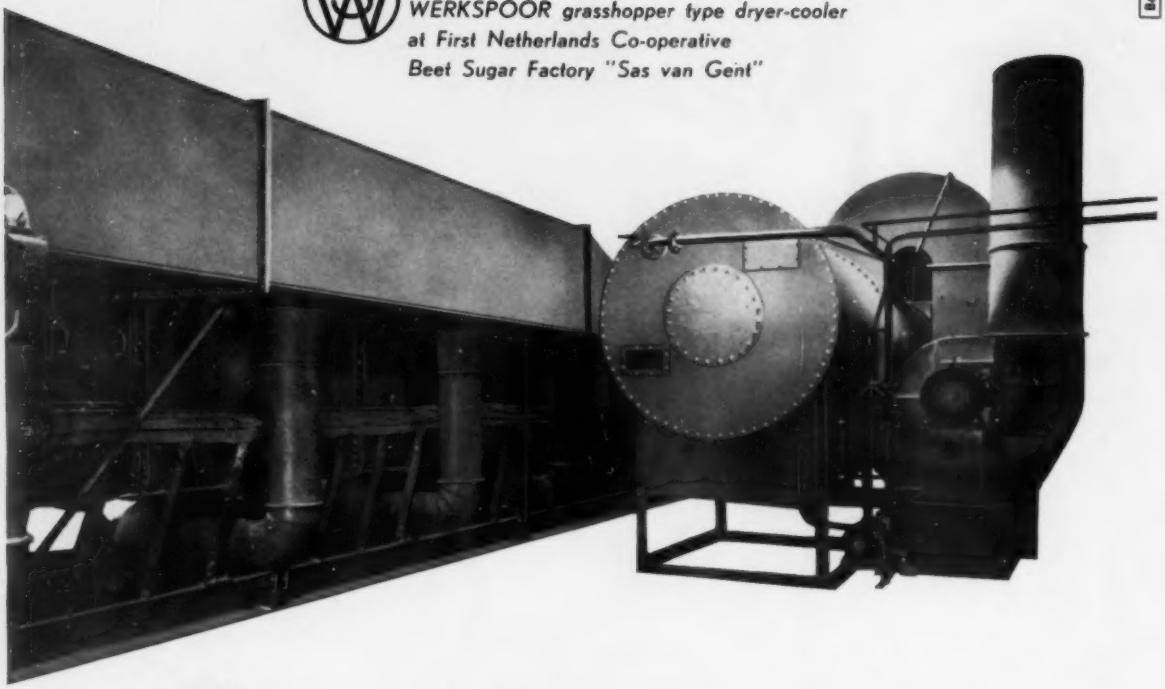

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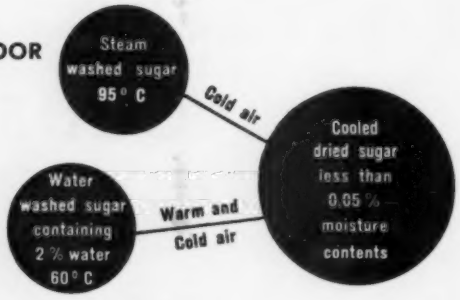


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ton of cane as well as 90 million pesos ($7,200,000 dollars) as their share of exports of 450,000 tons to the United States, the situation has quieted down. There is even feeling that management and the Union of Sugar Cane Producers will come to terms without necessity of a strike call.

Mill workers, in new wage demands, won increases ranging from 8 to 10%, according to economic capacity of individual mills, plus fringe benefits. Union won its demands after an eight day strike.

Cane workers, approximating 90,000, may be moving toward consolidation into one central union instead of the 20 regional unions now operating. Decision on this is to be made during the forthcoming national convention.

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On the international front, the feeling in Mexican sugar circles is that the 15% reduction in world quotas, as set during the early December meetings of the International Sugar Council in this city, is not an adverse measure. Ramon Absalon Quiroz, head of the Union of Sugar Cane Producers, said that the quota reduction is "unimportant" because it covered "anti-economic exports" of 75,000 tons, now reduced to 63,750 metric tons.

Mexico should follow a policy of seeking clients in the free market, Quiroz said, and he singled out the United States as Mexico's "best" market. And the American price of five to six cents a pound is much more "attractive" than the London pact rate set at 3.6 cents a pound, Quiroz added.

In any case, the recent Council meeting here has set an April 1, 1961 date for a final review of export quotas, because at that time there will be more exact offer and demand figures available.

Ralph E. Stedman, British economist, and head of the International Sugar Council, also revealed that a special committee has been set up to observe continuously the market world situation.

Producing countries have been asked to aid policy of maintaining stability of sugar production and prices in the world market.

And all nations having a basic export tonnage under 50,000 benefit from new rulings, assigning them 90% of their former quotas.

Placido Garcia Reynosa, Assistant Secretary of Industry and Commerce, and president of the Mexican delegation at the 8th meeting of the Council, accepted the decision to reduce the nation's quota but said that "Mexico is confident that when the International Pact is revised in Geneva in September of 1961, a system of export quotas will be adopted that is closer to reality than the one now in force."

Mexico will maintain its "traditional policy of strict compliance with its international commitments," Reynosa said, and for this reason will continue to build up internal demand. In 1960 internal consumption came to 1,035,000 metric tons, according to Reynosa, with this figure being 70,000 tons higher than that of the former year.

Mexican consumption has been steadily rising, as shown by figures presented by the National Union of Sugar Producers. In 1955 total was 800,385 metric tons, rising to 976,478 tons in 1959 and the above-mentioned figure for 1960.

Exports of Mexican sugar in 1960 hit 450,000 metric tons in round figures, and the Union said that in 1961 the industry will have enough reserves to export up to 900,000 tons.

The Mexican industry now employs 158,500 workers, with 74 mills turning out sugar. Capitalization of the National Union of Sugar Producers, created in 1958, is at 50 million pesos ($4,000,000 dollars).

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## Succession Cane Studied In Louisiana

New Orleans, January 3, 1961: In reviewing the progress of the cane crop since the start of the growing season last spring, it is very evident that the weather conditions were far from favorable. Unseasonably cool weather retarded the growth in the early part of the growing season and a protracted dry spell of weather kept the canes considerably below normal throughout the middle summer months. When the rains finally came, the crop began to grow very rapidly but this growing spurt carried on through the early fall with the result that most mills found it necessary to put off the start of the grinding operations until the last week in October. Even at that late date the cane was still green. It was necessary at the start of the grinding season to "top" the canes rather drastically and this, of course, reduced tonnage productions considerably. Then on December 2nd and 3rd temperatures several degrees below freezing were recorded in most sections of the sugar belt. Since that time there has been very little improvement in the sugar production per ton of cane. Fortunately, the weather has remained cool and clear during most of the month of December and the harvest has gone forward very rapidly. We believe that it is safe to state that Louisiana would have produced at least 460,000 tons of sugar, raw value, this year if the freezing temperatures had held off for a week or ten days.

---

As farmers, and especially Louisiana cane farmers must do, plans for the next crop go forward. Lloyd L. Lauden, Agronomist of the American Sugar Cane League, has called attention to an experiment being conducted by Dr. Leo Hebert of the U.S.D.A. Houma Experiment Station, to determine if the continuous planting of cane year after year on the same fields could be profitable in Louisiana. Mr. Lauden states that perhaps the failure of succession cane tried in Louisiana many years ago can be blamed on the small amount of fertilizer used at the time. He points out that at that time 16 pounds of nitrogen per acre was about the order of the day and that this amount was probably used on the succession cane. Today Louisiana cane farmers use about 60 pounds of nitrogen per acre on plant cane and about 90 pounds per acre on stubble cane. "There are other possible reasons," Mr. Lauden states, "why succession cane was unpopular years ago. Today, powerful tractors with heavy cultivating tools can do the job of destroying stubble and preparing a seedbed much easier and much more rapidly than mule-drawn equipment."

Mr. Lauden points out that most cane growing countries of the world do not rotate cane with other crops, as is the practice in Louisiana, nor do most other countries allow cane lands to remain fallow for a year to "rest" the land. He believes that the experiment started in Louisiana and the trials of private growers now going on will prove beyond doubt whether or not Louisiana can economically grow cane on the same land year after year without crop rotation. "If these tests prove that succession cane is profitable, and the soil is not harmed by this treatment," Mr. Lauden states, growers will be able to increase acreage without the purchase of additional land."

If succession cane growing is successful in Louisiana it should result in the rapid expansion of sugar production here as the returns per acre will be much more attractive than under the present system.

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Lloyd L. Lauden and a delegation of Louisiana sugarcane farmers totaling more than fifty left Louisiana by bus on January 9th for a tour of the Florida sugar industry. The group will return on January 14th.

Highlights of the trip will be visits to the U. S. Sugar Corporation's big mill at Clewiston, inspection of the cane fields at both Clewiston and Okelanta, and a trip to the U. S. D. A. Experiment Station at Canal Point.

Other points of interest include Silver Springs, Cypress Gardens and the famous Marineland near Daytona Beach.

## P. R. Technologists Elect Board Members

San Juan, January 3, 1961: At the annual meeting of the Sugar Technologists Association held at the Caribe Hilton Hotel in December the following officers were elected to the Board of Directors for the year 1961:

Carlos Haeussler, president; Rafael Hilera, vice president; Miguel V. Capllonch, treasurer; Manuel Mejia, Rubén A. Bonilla and José Navarro, directors for the Agronomy Section; Fernando Chardón, Antonio Roig, Jr. and Roberto Lefebre Muñoz, directors for the Economics Section; Bernardo G. Capó, Dudley Smith and Charles Lang, directors for the By-products Section; Miguel Ballester, Francisco Ramírez

Silva and Juan J. Gómez, directors for the Chemistry Section.

Very interesting papers were presented at this meeting which extended from December 8 to the 10th. The average attendance per day was about 200 technologists from the island and from other sugar producing areas. On the last day of the meeting a cocktail party was offered to the wives of the delegates and to the new officers.

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Various trials were conducted during the month of November with the new sugarcane harvester and loader developed by the J. and L. Engineering Co. of Louisiana. This machine has been designed and constructed under an agreement with the above company, the Sugar Producers Association of Puerto Rico and the Agricultural Experiment Station of the University of Puerto Rico. These preliminary trials were conducted at Jeanerette, La. and they were observed by various representatives from Puerto Rico, namely: Arturo Roque, Dr. J. Rodríguez Arias, Harold Willett, J. Guzmaán and Rafael Martínez. The group from the island was favourably impressed by the satisfactory performance of this machine in its initial trials. This harvester will be sent to Puerto Rico during the month of January for further trials at Central Coloso and other sugar mills. After the completion of the trials the harvester will become the property of the Agricultural Experiment Station.

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In cooperation with the Agricultural Research Service from the United States Department of Agriculture, the Agricultural Experiment Station is constructing a large experimental phytotron for controlled environment to fit biologists needs. This phytotron will have six plant growth rooms and a large greenhouse for the controlled environment in plant growth. The establishment when in operation will offer control of air temperature, air distribution, light intensity, light quality, relative humidity, day length, root medium, nutrition and water supply. It is expected that with this new equipment in operation, the sugarcane breeding program will be greatly improved, since it will increase the possibilities of crossing a larger number of different sugarcane varieties. It will serve also for conducting nutrition studies to improve fertilizing practices with various crops. (See also, "First Phytotron In Australia," SUGAR Y AZÚCAR, Pg. 35, October, 1960.)

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A Committee appointed by the Insular Board of Minimum wages has approved a resolution fixing $1.04 per hour as the minimum wage for sugar factories. The resolution, which passed a margin of one vote will become legal by the end of January 1961. The Committee is composed of three representatives from the sugar industry, three representatives from the labor unions and one representative from the public interest. The labor representatives had been asking for a minimum wage of $1.20 per hour.

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The group of sugar centrals that had made plans to start operations early in the month of December, has been reduced to four sugar mills, namely: San Vicente, Coloso, Plata and Igualdad. Heavy and continuous rains in various regions of the island delayed the start of the campaign in other sugar centrals. Preliminary reports on sugar yields are low and not very encouraging, with the exception of those reported by central Coloso where an improvement from the previous year's report is shown. Further delays are expected in several other sugar centrals where labor agreements are under discussion. The Sugar Producers Association of Puerto Rico, representing eight sugar centrals, has been discussing with the Sindicato Azucarero the terms for collective bargaining under a proposed agreement for two years, but not much progress has been made. The sugarcane growers are eager to start early harvesting operations this year in an effort to improve the labor supply problem. They know that by the month of April or May a large proportion of the labor force migrates to the mainland to work in vegetable farms.


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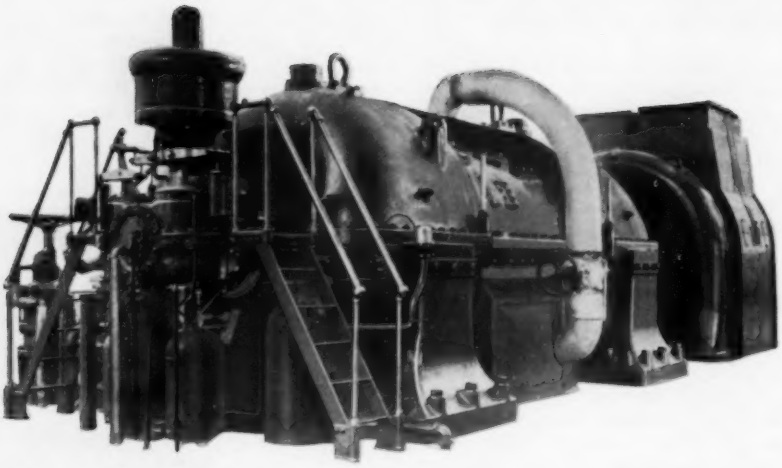

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This year Central Mercedita will harvest around 2,000 acres of cane that was fertilized with urea at the rate of 300 pounds per acre. The aerial application of this fertilizer was made with a Grumman "Ag-Cat" that could handle up to 400 acres per day. Two variations were tried: One being two 150 lbs. applications at seven and 14 weeks after harvesting, and the other, 300 lbs. application at 12 weeks after harvesting. The results during this crop will determine whether to continue this new system of foliar application of urea on a commercial basis.

### Cane Diffusion Successful In Hawaii

HONOLULU, JANUARY 3, 1961: Continuous diffusion of sugar cane is practical and the design of a full-scale commercial unit is well advanced.

This is the report released recently by American Factors Associates, international sugar consultants who participated in the two-year Hawaiian research study on the project through Kekaha Sugar Co., one of their affiliated plantations. The pilot operation was jointly conducted by the Experiment Station, Hawaiian Sugar Planters' Assn., Kekaha, and several suppliers of equipment.

Charles H. McAlister, factory superintendent at Kekaha and one of the men who has worked most closely with the project, prepared an article for Sugar Research and Management Newsletter, published by American Factors Associates. Mr. McAlister expressed the opinion that there would be one or more diffusers operating in Hawaii within the next two years. There are other reports that a number of sugar areas are investigating diffusion and may soon place orders for equipment.

### Highlights Of The Hawaiian Cane Diffusion Study

- **It is practical to undertake continuous diffusion of sugar cane with commercial-type machinery now available.**
- **Juices produced are equivalent in quality to milled cane juices.**
- **Economies of this type of processing appear favorable on the following points:**
  1. **Higher extraction (97½% appears readily attainable in commercial operation).**
  2. **Capital investment in new equipment should be about 20% lower than a mill train.**
  3. **Power requirements for operation is less, estimated at one horsepower per ton of cane per hour.**
  4. **Maintenance costs are probably one-half of those required for a mill train.**

During the 1960 pilot plant operation a total of 9,182 tons of cane were diffused. The logged time was 653 hours, or an average of 14 tons per hour. During the majority of runs the rate ranged between 15 and 16 tons per hour.

"There seems to be no appreciable difference in cane juice or bagasse from the diffuser and mill train. And in refinery tests, indications were that liquors from diffusion sugars are somewhat easier to decolorize than conventional mill train sugar liquors. Ash content also was appreciably less for diffusion liquor," says Mr. McAlister.

A Silver D.D.S. diffuser was used in the two-year research program. Preparation of the cane, which is very important in diffusion, was undertaken in two steps during the 1960 operation. A 15-inch prebreaker was the first step and an 18-inch disintegrator followed. The Silver diffuser, which is now being designed for commercial use, will have a considerably larger capacity than the test unit. Actually, the highest run in the pilot study was 20 tons per hour—with 15 tons being about average.

It is estimated that the diffuser unit will cost $200 per ton of cane per day—for units of 1,200 to 1,500 tons per day capacity. Larger units will probably be less expensive, per ton. Cost for preparation machines can be based on about $100 per ton of cane, per day. Dewatering equipment is estimated to cost about $100 per ton, per day. Total cost for preparation, diffusion and dewatering for small plants will average approximately $400 per ton, per day.

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Representative Harold D. Cooley, Democrat member of the United States Congress from the State of North Carolina and chairman of the U. S. House Agricultural Committee, was the principal speaker before the year-end meeting of the Hawaiian Sugar Planters' Assn., in Honolulu.

Mr. Cooley expressed the hope that American sugar producers would work together for good sugar legislation. He commented that the people of Hawaii and Puerto Rico should provide "the strong leadership needed" to bring all forces together "so we can move along" in sugar legislation coming up in the next Congress.

On the overall agricultural picture in the United States, Mr. Cooley said, "Unfortunately, the house of agriculture is divided." He urged: "We must lift ourselves above the bondages of partisan politics."

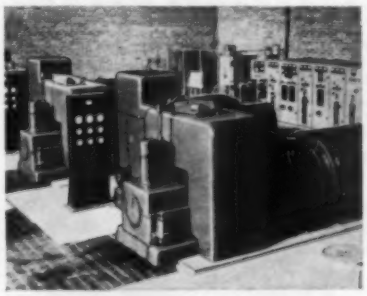
He said that in recent times agriculture has been subject to partisan politics—that legislators "were looking for the popular thing to do." Agriculture suffered, he commented. He said if freedom from government control of agriculture prevailed—as some advocate—American economy would go down the drain.

The next secretary of agriculture Represenative Cooley said, will have a millstone around his neck to start. The U. S. has $96 billion worth of commodities which it cannot sell and cannot give away.


**TYPICAL EXAMPLE:**

**Westinghouse**

**TURBINE-GENERATORS AT WORK IN MEXICAN SUGAR MILL**



This trio of Westinghouse non-condensing turbine-generators supplies power for one of Mexico's largest sugar-processing plants. Rated at 3,000 kw each, they deliver 60-cycle current at 480 volts; are driven with 160° F. superheated steam at 225 psig. Exhaust steam, at 15 psig, is available for other mill uses.

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Of sugar legislation, Mr. Cooley said it is "unfortunate" that of his 34-man committee, "not a single one" came from a sugar producing district.

---

In other talks at the sugar planters' annual meeting, Sanford L. Platt, vice president and Washington representative of HSPA, said that up to this year, there was little interest in sugar legislation.

But now, he said, "for the first time the American public is acutely aware of the Sugar Act."

He said "this great change" resulted "entirely from the machinations of the Castro regime in Cuba."

Mr. Platt characterized the past year in Washington as "often times hectic" in regards to sugar problems. "Probably no year in recent history has produced as many spectacular developments in the sugar world as have occurred in 1960."

Dr. Leonard D. Baver, director of the Experiment Station, HSPA, pointed out that by "working at" possible savings uncovered by research, Hawaii's sugar growers could recover production equal to that of two 50,000-ton plantations, each year. He summarized the objectives of sugar research at the station, including work on continuous diffusion, and the new HSPA cut-load harvester.

Dr. Baver said decreases could be made in the cost of production by: new knowledge of the climate we are working with; soil improvement; methods of fertilization and improved varieties. He said the industry was spending about $600,000 annually on the variety program at this time and getting back $15 to 20 million in return.

Rat damage was estimated at probably 1/10 ton of sugar per acre.

He expressed the feeling that the industry was on the verge of a break-through in new harvesting methods.

The year 1960 has been the "most revolutionary" year in sugar marketing since 1934, Donald Maclean, president of the California and Hawaiian Sugar Refining Corp. told members of the HSPA annual meeting.

He said from the Jones-Costigan Act in 1934, which first gave the Secretary of Agriculture power to estimate consumption and allocate quotas, until 1959, marketing problems were relatively stable. However, "actions which took place this last year have destroyed this pattern."

---

American Factors Associates have been retained by the government-owned Taiwan Sugar Corporation to make a preliminary study of their sugar industry.

C. E. S. Burns, Jr., manager of Oahu Sugar Co., will head the Taiwan study group from the international sugar consulting organization. Field practices, transportation, milling problems and matters affecting organization, will be covered.

American Factors Associates was organized in 1959 for the purpose of offering world-wide counsel and management services in all phases of sugar production. The company is composed of American Factors, Ltd. and their six affiliated sugar plantations. This is the largest sugar producing group in Hawaii.

Recently, American Factors Associates announced a contract with the Government of Western Australia to develop 1,300,000 acres of land, known as Esperance Plains. Cane sugar production is not involved in this project.

---

Hawaii finished the 1960 crop on December 23 with about 935,000 short tons of raws for the year and shortly afterward the 1961 crop started early in Hawaii. Seven of the state's sugar plantations started to grind during the first week in January. All of the 27 plantations plan to be harvesting by the second week in March.

### Canadian Shipments Up In 1959

MONTREAL, JANUARY 5: Shipments of sugar by Canadian refineries increased 2.3% in volume to a record 829,115 short tons from 810,679 tons in the preceding year, while the factory value decreased 8.7% to $120,061,000 from $131,434,000, according to the Dominion Bureau of Statistics annual industry report just issued. Shipments of refined cane sugar reached a new high in volume at 675,425 tons versus 660,531 in 1958 but the value was smaller at $96,906,000 versus $104,221,000. Shipments of refined beet sugar also reached a new high at 153,690 tons versus 150,148, while the value declined to $23,155,000 from $27,213,000.

Number of establishments in 1959 rose to 12 from 11, employees to 3,427 from 3,270, and salaries and wages to $13,568,000 from $12,673,000. Materials and supplies cost less at $88,350,000 versus $91,854,000, and the value added by manufacture was lower at $25,937,000 versus $42,385,000.

---

Acadia-Atlantic Sugar Refineries, Ltd., has announced plans for a three-for-one split of common stock—and a 150% boost in dividend—the biggest increase many veteran stock exchange brokers could remember.

Acadia-Atlantic Sugar will propose a subdivision of its common stock on a three for one basis at special meeting of shareholders to be held in the near future.

Additionally, the company proposes to place the split stock on an annual dividend basis of 50 cents per share, equivalent to $1.50 per annum on the present stock which now pays 15 cents quarterly, or a total of 60 cents annually.

J. A. Gairdner, president, said that preliminary figures for the year ended December 31 last show that net income of $2,170,000 equalled to $2.77 a common share. This would compare with net of $1,375,085 or $1.44 a share of common for the previous year.

# SUGAR ABSTRACTS

**Published under the Auspices of the International Society of Sugar Cane Technologists**

**by Special Arrangement with**

**SUGAR y AZÚCAR — Professor Mario A. Mascaró, Editor**

## Agriculture

### Progress Report on Cultivation Practices At Central Aguirre Sugar Company

By W. S. BARNES, *General Field Superintendent at Large*

Aguirre carries on an active quest for improved methods in cultivation.

Studies are being made to evaluate the merits of deep aqua ammonia injection, compared to the present plantation practice.

Field experiments have also been installed to observe and measure the results of a discostre or cross-harrowing practice. This cultivation is done on very young cane to smooth out field texture, eradicate early weed growth and promote better germination. This operation is followed by the application of aqua ammonia. Immediately thereafter the field receives an aerial application of a post emergent herbicide. We hope thus to institute complete weed control.

Other cultivation studies are under way to improve irrigation performance, drainage control and replant effectiveness.

Additional attention is being given to field equipment, to obtain maximum efficiency and improved field conditions.

■

### Mechanization of the Australian Cane Crop

*Australian Sugar Journal, Vol. 50, No. 12, pp. 1000-1002 (1959)*

As reported at the 51st Annual Meeting of the Australian Sugar Producers' Association, only about 36% of the 1958 crop was mechanically loaded. Nearly all these loading machines are of the front-end type. As to mechanical harvesting, there were only 26 cane cutting machines used in the 1958 season, but seven of these were of the simple "blade type," which require hand-topping of the cane.

Between 1954 and 1958, the proportion of the crop harvested by all types of harvesters did not exceed 2.2%. This situation is due to the fact that no machine has been found that will satisfactorily handle all field conditions that exist in the country.

Engineering research now under way is focused on development of the following types of mechanical harvesters: (1) Cutting machines like the Fairymead machines, and the J. & L. and the Venton machines that lay the cut cane on the ground, loading being a separate operation. (2) The "vertical grab type" harvester that will both cut and load whole sticks, using conventional trucks for transport to the mill. (3) The Massey-Ferguson machine designed for the dual operations for cutting and loading, but which chop the cane into short lengths that are transported to the mill in box-type trucks. The Massey-Ferguson machine can ground-cut and load in a wide range of conditions, but it cannot top the cane unless the crop is erect enough to permit machine-topping.

It is expected that, in the end, the ultimate solution of the problem will be construction of different types of cane harvesters designed for a variety of typical field conditions.

■

### Spraying Equipment Factors to be Considered for the Proper Application of Wettable Powders Herbicides In Sugar Cane

*By* MANUEL MEJÍA VALENTIN

Chemical weed control developments over the last few years have provided the sugar cane industry with an efficient means to lower cultivation costs. Proper selection of compounds to be used plus correct timing of applications and more careful supervision of spraying techniques give the experienced chemical users even further opportunity to reduce the cost of weed and grass control. Other factors being equal, proper selection and usage of application equipment spells the difference between low-cost, efficient control and the "failures" all too often charged against the chemical compound or compounds rather than to faulty treatment techniques.

In Puerto Rico three distinct types of equipment are currently encountered in the fields—knapsacks, tractor mounted or tractor drawn, and the airplane. Each has its definite use in accordance with planting system, terrain, etc. Certain characteristics should be present in each type. These factors include: adequate pump capacity for the type of application desired, sufficient and proper agitation within the tank, particularly when using wettable powder herbicides such as the Substituted Ureas, rapid action positive control valves, and booms and nozzles of proper size for the spray volume desired with correct nozzle spacing on the boom. Equipment must be properly calibrated and the supervisory personnel must constantly ascertain that unauthorized adjustments are not made by the operators.

■

### Sugar Canes That Withstand Drought

P. C. RAHEJA, *Indian Journal of Sugar Cane Research, Vol. 3, No. 3, 1959*

The author summarizes a series of investigations on nine Coimbatore canes in India which were grown both during hot weather and autumn months when conditions of drought prevailed. The general results demonstrated that varieties which had high foliage/root ratios had low relative transpiration rates. Statistical examination of the data indicated there was high significance correlation between the two factors when soil mois-

ture for the unirrigated crop was the critical factor. The lower is the respiratory activity, the greater is the efficiency of the variety in utilizing the plant food and water in the soil. Also, the roots of such varieties show greater ability to penetrate into the sub-soil in search of water where the availability of oxygen is low. It is suggested that classification of sugar canes according to their foliage/root ratios would be a valuable guide in choosing varieties adopted to droughty conditions.

■

### Factors Affecting Germination of Cane After Hot Water Treatment

A. G. BARRIE, *Proceedings Queensland Society Sugar Cane Technologists, Vol. 26, pp. 93-103 (1959)*

Hot water treatment for control of stunting disease in Queensland has frequently resulted in poor germination; many reasons have been suggested to account for its failures, but as yet no infallible practices can be recommended to overcome it. It seems that in many cases it is advantageous to use middle-age cane for planting.

Top sets of non-arrowed stalks of this age gave outstanding results. Cane from outside rows was more resistant to damage by hot water treatment than cane from inside rows. There is evidence to show that once a "good source" of cane for planting has been located by experience, it would be advisable to reserve this land to grow cane for planting. The level of nutrition and type of crop (whether plant or ratoon) did not appear to be major factors in the difference in resistance to damage by long hot water treatment. Variable results were obtained when using whole stalks instead of sets. Rapid cooling after removing the cane from the hot water was not beneficial but was damaging in one instance; keeping the cane damp for a period after the treatment also did not help. Probably the factor most important in resisting damage is the cane's auxin content, but temperature and maturity are also important.

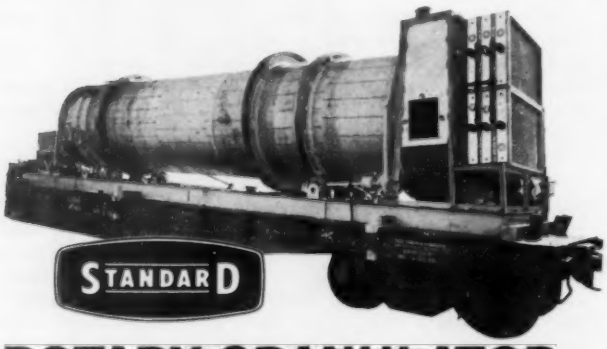
■

## Technology

### The Viscosity of Final Molasses

*Sugar Research Institute, Mackay. Technical Report No. 51 (1958)*

Since the viscosity of final molasses is the major factor limiting practical exhaustion, studies were made to determine the effect of heat treatment and dilution prior to fugalling, and the removal of suspended and dissolved impurities on viscosity. The viscosity at saturation when plotted against temperature sometimes shows a sharp drop to a minimum above 60°C and then rises, while at others flat curves rising only about 70°C are obtained. This is related to the variation of solubility coefficient with temperature. On the whole, it appears that reheating is preferable to dilution as an economic means of reducing viscosity. Removal of suspended solids (sludge) from final molasses significantly reduces viscosity and may nearly halve the original value. This suggests that substantial benefits may accrue if the sludge were removed from B molasses. Working with a solution of sucrose—glucose—fructose, the influence of various inorganic salts on viscosity have been studied. The order of decreasing influence of cations was Na, Mg, Ca, K and NH4; and for anions, phosphate, aconitate, sulphate and chloride in that order. Ca and Mg sulphates and chlorides which have strong affinity for water, decrease the solubility of sucrose appreciably, while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other salts have the opposite effect. Precipitation of impurities from molasses by fractional addition of ethyl alcohol gives sharp reduction in molasses viscosity. Substances removed were partly polysaccharide, partly nitrogenous, and partly sulphates and aconitates of potassium and calcium.

■

### A New Idea In Maintenance of Vacuum In Pans

ALFRED WEBRE

A steady vacuum of correct intensity is essential to the production of uniform sugar crystals free of conglomerates and fines, and to this end, the use of independent condensers for each pan has generally been adopted, but because of various considerations some fluctuations in the vacuum system still persist, so that along with independent condensers the need for independent vacuum pumps, too, has been generally recognized.

Ejector condensers, reciprocating vacuum pumps and steam jet vacuum pumps have been successfully employed in connection with individual condensers, each with its own advantages and disadvantages, but for simplicity, reliability, dependabilty and flexibility, the hydraulic vacuum pump is outstanding.

Besides a brief history of the original application of this pump, the author of this paper gives full details for the construction of a hydraulic pump capable of handling the requirements of a 14-foot pan, and its application in multiple units to a complete sugar factory.

■

### The Problem of Cut Cane Deterioration

L. G. SCOTNER, *Producers Review, March, pg. 71 (1959)*

In view of developments in the construction of mechanical harvesters where, as a part of the harvesting operation, the cane is cut into short lengths, experiments were made to see whether these short pieces deteriorated faster than whole stalks. Nine major varieties were tested and it was found that the cut up cane lost commercial cane sugar at a slightly greater rate than the whole stalk. The differences were not very consistent but on the average it would appear that, calculated in terms of the original commercial cane sugar, the loss in cut up cane was about one percent greater at the end of two day period after harvesting. After four days this difference had increased to about two and one half percent.

■

### New Cane Mud Filtration System at Central Plata

*By* RAMÓN RAMOS, JR. *and* PEDRO J. RODRÍGUEZ

Discusses results of a new filtration process with a conventional Oliver filter that provides a clear filtrate for direct feed to evaporators. The new Rapi-Floc Filtration Process involves controlled coagulation employing lime and a polyelectrolyte. Filter modifications comprise addition of coagulator, cover wash collecting trough and special fabric filter medium. Continuous operation of an 8 x 12 Oliver filter during the past grinding season showed 50-100% increase in capacity, low cake sucrose values and clear filtrate.

A novel type of stationary curved screen was employed for secondary screening of the raw juice to remove fine fibre prior to defecation. The overall benefits to the clarification and filtration stations are discussed along with other applications in the factory flow sheet. Improved clarifier and filter operation at Central Plata this season is attributed in part to this new Dorr-Oliver DSM screen.


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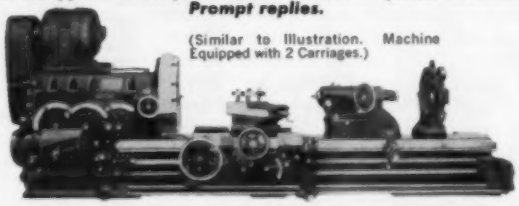

(Similar to Illustration. Machine Equipped with 2 Carriages.)

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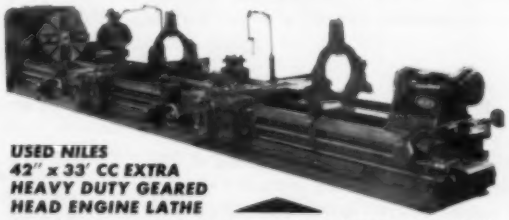
Actual Swing Over Ways: 45". Two Carriages with Rapid Traverse. Spindle Speeds: (6) 42 to 157 RPM. Taper Attachment. 42" Diameter Chuck. Steady Rests.



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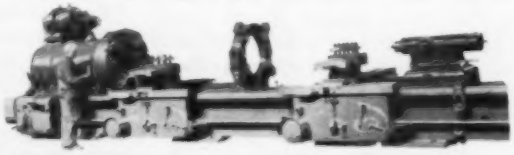

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MDNA MEMBER

# Major Plans For Sugar Expansion In Florida

ACTIVITY approaching boom proportions is evident in the Florida sugar industry. With the lifting of acreage restrictions, the chaotic situation in Cuba and the fact that Mainland cane areas have not made their quota for the past several years, it is reported that $40 million has already been committed for expansion of existing facilities and the construction of new mills and refineries in Florida alone. Farm land prices have advanced in the cane growing areas.

U. S. Sugar Corporation has announced a $20 million expansion program. The Corporation will build a refinery in equal partnership with Savannah Sugar Refinery Corporation. The refinery will be located near Canal Point and should be ready in the spring of 1962. At the same location, U. S. Sugar Corporation will construct a new raw sugar mill. When completed, the new facilities will add 140,000 tons to U. S. Sugar's production.

Okeelanta, which acquired the mill at Fellesmere some time ago, plans to spend $10 million on increased capacity over the next two to three years.

At Belle Glade, Florida, the Florida Sugar Corporation, owned by former Cuban sugar interests has planted 2,000 acres in cane and has started to erect the former Evangeline sugar mill which has been dismantled at its site at St. Martinville, Louisiana and shipped to Florida.

In this same area plans are being studied for the construction of another cooperative sugar mill. According to "The Miami Herald", Harry T. Vaughn, president of U. S. Sugar Corporation, predicts that Florida's sugar production will jump from the present 175,000 tons to 260,000 tons within two years and to 320,000 tons in three years.

It is anticipated that after Congress passes new sugar legislation, a number of other sugar projects in Florida will be announced. There is a strong feeling that Florida's quota will be substantially increased with the advent of new sugar legislation. Florida is represented on the Agricultural Committees of both Houses of Congress by Senator Spessard L. Holland and Representative D. R. Matthews. Possibility for expansion is tremendous; it has been estimated that there are 300,000 acres of potential sugar cane land in the Everglades alone.

■

### West Indies Sugar Claim $30 Million From Cuba

Claims for compensation in excess of $30 million are being pressed against Cuba by West Indies Sugar Corporation. Organized in 1932, the company operated in the Dominican Republic and Cuba. In 1957 its Dominican sugar properties were sold at a price of $35 million according to a report in the *Wall Street Journal*. Cuban properties consisted of four large mills with an annual capacity of 325,000 short tons and 246,000 acres. These properties have been seized by the Cuban government. In February 1960 stockholders voted to liquidate the company. The company now has no business except the protection of its claims according to Thomas N. Tarleau, president.

■

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Those interested in SUGAR Y AZUCAR Personnel Service may contact Roy J. Leffingwell, Manager, P. O. Box 4034, Honolulu 12, Hawaii, or telephone Honolulu 67-677, or cable "PanPub", Honolulu.

■

### Cuba Offers Molasses To U.S. Buyers

With over 200 million gallons of blackstrap molasses available for export this year, the Cuban Sugar Institute has approached U.S. buyers with an offer to dispose of the entire production in a single sale according to a *Wall Street Journal* report. Most recent sale was 25 million gallons to a British firm at 10 cents per gallon. There is reason to believe that United States buyers will not be receptive to offers of Cuban molasses. While it is not at present affected by the ban on sugar imports, there is some speculation that the Kennedy Administration might extend the embargo to Cuban products other than sugar. In addition, U.S. purchasers might encounter difficulties in getting the molasses unloaded at U.S. ports if workers should refuse to handle the cargoes.

■

### Sugar Ester Surfactants

Properties of sugar ester surfactants and suggested methods of their preparation are described in a pamphlet newly-issued by Sugar Research Foundation, Inc. Use-studies indicate that the esters may have potential applications in foods, pharmaceuticals, cosmetics, drying oils, and petroleum products. Copies of the pamphlet, "Sucrose Ester Surfactants", may be obtained by writing the Foundation at 52 Wall Street, New York 5, New York.

■

### International Sugar Council

During the week of February 20th the International Sugar Council will hold its Ninth Session to consider the situation created by suspension of the New York Coffee and Sugar Exchange Contract No. 4. This contract was the basis on which the price provisions of the Agreement operated. The Ninth Session will make the final determination of initial export quotas to the free market for 1961.

■

### Lamborn Closes Havana Office

Closing of their Havana office after 47 years of continuous operation has been announced by Lamborn, Craig & Company, international sugar brokers.

■

### American Molasses Acquires Food Products

The entire outstanding capital stock of Food Products Company has been acquired by American Molasses Company through an exchange of stock according to an announcement by Frank C. Staples, President of American Molasses. Food Products, with headquarters in Kansas City, is a leading supplier of technical ingredients to the baking and dairy industries. Mr. Robert M. Rapaport is, and will continue to be, the President of the company. American Molasses is well known as a major refiner of granulated and liquid sugars and the world's largest blender of edible molasses.

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* "Paper for Printing" Today and Tomorrow, by the Intelligence Unit of The Economist, London, Presented jointly by UNESCO and FAO.

** A study of newsprint expansion, a process report by the United States Department of Commerce to the Committee of Judiciary, House of Representatives (U. S. Printing Office 1952).

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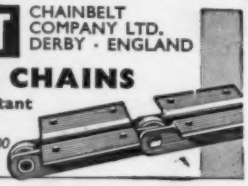

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## Cuban American To Continue U.S. Operations

Despite the confiscation of its substantial Cuban properties, Cuban-American Sugar Company will in all probability continue its operations in the United States said David M. Keiser, chairman, at the company's annual meeting. Cuban American operates the refinery at Gramercy, Louisiana through its subsidiary, Colonial Sugar Company. In addition, the company owns 90% of the stock of Industrial Sugars with a liquid sugar plant in St. Louis and 23% of the stock of American Crystal. The company is pressing law suits in foreign countries to recover proceeds resulting from sales of sugar from its confiscated Cuban properties. All hope of someday resuming operations in Cuba has not yet been abandoned, said Mr. Keiser.

■

## USSR Beet Crop 50 Million Tons

Soviet experts estimate the 1960 beet harvest at 50 million tons according to an announcement by the Soviet Embassy in Washington. The crop was raised on an area of approximately three million hectares. Average yield per hectare was 17.2 tons. Harvesting is rapidly being mechanized, says the Embassy announcement, with 35,000 beet harvesters in operation on this year's harvest.

■

## Guantanamo Sugar Co. Investigating Florida

At the annual meeting of Guantanamo Sugar Company it was announced that officials of the company were investigating possibilities of continuing operations in Florida. Assets of the company in the United States amount to approximately $400,000; their three mills in Cuba were seized by the Cuban Government without provision for compensation. While the company proposes to submit documents to the State Department in order to prosecute a claim against the Cuban Government, the prospects for an early, or even an eventual, settlement appear obscure. Stock in the company, formerly listed on the New York Stock Exchange is in process of being delisted.

■

## I. H. Kemper Honored In Galveston

A dinner in recognition of his many years of community service was given on January 14th at Galveston, Texas to honor I. H. Kemper, Chairman of the Board of the Imperial Sugar Company of Sugar Land, Texas. In addition to his extensive financial, industrial and agricultural activities, Mr. Kemper has a distinguished record of civic service. He has served as Galveston's treasurer, on the first board of city commissioners and was mayor of Galveston in 1917-18. He is a member of almost every civic organization in that city.

*This type of mechanical loading is becoming essential in Puerto Rico as a measure to reduce costs and supplement a shrinking labor force.*

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*Importante Reporte de Lawrence Myers*

# Azúcar - Donde Estamos?

AZÚCAR

FEBRERO 1961

"IMPLICA un gran peligro demorar demasiado la extensión del Acta Azucarera" dijo Lawrence Myers, desde hace mucho tiempo Director de la División Azucarera del Departamento de Agricultura de los EE.UU. al hacer uso de la palabra en el Club Azucarero de Nueva York en Enero 19, 1961.

Se anticipa que la extensión es solo por nueve meses con el fin de dar al Congreso tiempo suficiente para redactar la legislación á largo plazo y realmente adecuada á las nuevas condiciones á que se enfrenta la industria azucarera. Por tanto, la demora en aprobar dicha extensión puede acarrear serias consecuencias, dice Mr. Myers.

En una plática altamente significativa, Mr. Myers revisó los acontecimientos del pasado año y felicitó al comercio azucarero por la forma con que habia hecho frente á varias situaciones críticas durante 1960.

Mr. Myers dijo:

"Si la situación mundial fuera normal, lo que harían las personas reflexivas sería 'Detenerse, Mirar y Oir'. Durante los últimos cinco años la producción azucarera mundial se ha expansionado á un promedio anual de cerca de tres millones de toneladas ó el seis porciento. Esto es alrededor de tres veces la proporción en que ha expansionado la población mundial. Afortunadamente los niveles de vida tambien han aumentado y los incrementos en el consumo de azúcar per cápita han permitido que el mundo absorba los aumentos de producción."

"Sin embargo, no nos dejemos engañar. Los aumentos recientes en la producción mundial no han sido respondiendo enteramente á las demandas del mercado libre mundial. Una gran parte de éstos aumentos de producción han sido para mercados protegidos. Una vez y otra vez hemos oído las viejas exclamaciones de 'autoabastecimiento nacional' ó 'autoabastecimiento nacional con margen de seguridad' ó 'autoabastecimiento nacional con un sobrante para divisas extranjeras'. Estos objetivos en el pasado han contribuído al exceso de producción, bajos precios y hasta desastres económicos".

En tiempos normales, continúa Mr. Myers, habría sido responsabilidad de la comunidad azucarera advertir á los productores de los peligros del exceso de producción y se hubiera esperado que el Consejo Internacional Azucarero adoptara medidas. Pero con una tercera parte de la producción mundial azucarera bajo control comunista, Rusia y China están en posición de asolar y hacer estragos con la oferta y demanda azucarera. En cierto momento un funcionario Cubano anunció que Cuba produciría sin limitación alguna, bajaría los precios mundiales y forzaría á los competidores á quedar fuera del mercado mundial; un momento después otro funcionario Cubano manifestó que prácticamente toda la producción Cubana sería consumida por la Unión Soviética y la China Roja. El mundo está amenazado no solamente por la posibilidad de que la producción Cubana pueda ser consumida por los países comunistas sino tambien por el peligro de que la ineptitud y la inexperiencia administrativas reduzcan la producción Cubana.

Bajo estas circunstancias difícilmente tenemos nosotros el derecho de apremiar á otros países para que abandonen sus programas de autoabastecimiento azucarero ni éstos países van á escucharnos ó prestarnos atención. En consecuencia la producción azucarera está en aumento en ambos: el frente universal y nuestro frente doméstico.

Haciendo un bosquejo sobre como tal vez el Congreso acometería la nueva legislación azucarera, Mr. Myers recalcó que el programa doméstico azucarero ha sido un éxito; en realidad el mas satisfactorio de todos nuestros programas agrícolas. Por tanto habrá una fuerte tendencia á continuar el programa substancialmente en su forma presente. Sin embargo, esto no debe cegar á la industria sobre la necesidad de re-examinar el programa azucarero.

Refiriendose significativamente á tales problemas como el planteado con urgencia por los nuevos cultivadores de remolacha sobre participación en las asignaciones de áreas cuando éstas sean re-establecidas, los deseos de la industria de remolacha para construír nuevas ampliaciones de producción y otros asuntos parecidos, Mr. Myers dijo:

"Bajo el programa se han desarrollado algunas fuertes presiones económicas. Sería un lamentable error para la industria apremiar al Congreso "simplemente para barrerlas debajo de la alfombra". Si se intentara hacer eso yo me atrevería á decir que descubriríamos que algunos de esos problemas pueden morder.

No se puede pedir al Gobierno que arregle todos los problemas y disputas que surgen dentro de la industria. Mas bien yo sugiero que la industria adopte un programa de actuar por sí misma. Ustedes conocen vuestros propios problemas, las fuerzas y tensiones que existen, los arreglos y obligaciones que deben hacerse si un programa para vuestra industria debe ser escrito en una legislación y administrado con buenos resultados. . . . La alternativa de ajustar los problemas dentro de la industria tiene algo de corazonada ó presentimiento. . . . La industria debe asumir la responsabilidad mayor fomentando estas soluciones."

Mr. Myers indicó que tal vez mas nunca dependerá éste país enteramente de otro en el abastecimiento de azúcar hasta el punto que ha dependido de Cuba en el pasado. Si nos volvemos hacia otras numerosas fuentes de abastecimiento, será necesario que esos países desarrollen la función que Cuba ha hecho durante tantos años. Cuba producía y almacenaba enormes cantidades que vendía á los Estados Unidos en cualquier tiempo. Cuba adoptó una política de vender azúcar á este país cuando la necesitaba y no cuando era más conveniente para Cuba venderla ó embarcarla. Los que aspiran á reemplazar a Cuba, dijo Mr. Myers; deben considerar hasta que punto son aptos, capaces y dispuestos á llenar éstas funciones.

"Indudablemente habrá el deseo" dijo Mr. Myers, "de reservar alguna cuota para Cuba en el caso de que vuelva á ser una fuente de abastecimiento amistosa y segura. Se necesitará una decisión sobre qué cantidad de cuota para Cuba y cómo puede reservarse eficazmente".

Objetó la fuerza y rectitud de las proposiciones sobre ampliar el acta azucarera año tras año hasta que se aclare la situación de Cuba, afirmando que muy poco se ganaba posponiendo arreglos necesarios para una legislación satisfactoria, incluyendo una decisión sobre el tamaño de alguna reserva para Cuba y el método para mantener ésta reserva.

En conclusión, Mr. Myers dijo:

"Si ha de haber un gran cambio en nuestras fuentes de abastecimiento y si los nuevos abastecedores han de producir y mantener suministros adecuados de azúcar para éste mercado, deben ser informados de sus responsabilidades lo antes posible. Tambien debe darse á ellos seguridades sobre que se les permitirá vender los suministros que elaboren y mantengan con destino á este mercado".

## *La Distribución del Tiempo Perdido*

# Acceso á ésta cuestión por medio del concepto "Pérdida de Tonelaje"

C. C. Redman

Los reportes sobre tiempo perdido porciento del tiempo total, y la distribución á sus distintos conceptos, solamente tienen verdadero valor á condición de que la parte de elaboración de una fábrica de azúcar crudo tenga amplia capacidad en todos sus departamentos para procesar la máxima capacidad de la planta de moler; y siempre que no haya necesidad de reducir el paso de los molinos bien por problemas en el transporte de la caña ó por deficiencias en la capacidad del campo para suministrar el tonelaje de caña requerido.

Estas condiciones ideales de operación no se logran ni pueden lograrse en la práctica, simplemente porque con independencia de la posibilidad de diseñar una fábrica "balanceada," á pesar de eso ésta posibilidad puede existir sólo con una condición específica.

Toda vez que los equipos se diseñan para condiciones promedio, es obvio que cualquier cambio en ésta condición específica promedio afectará la terea ó producción total de dicha unidad individual. La caña es una materia prima esencial y altamente variable en su composición; y como es tradicional en todas partes medir en unidades de caña relacionadas á tiempo, para expresar capacidades, no hay ni que decir que tales capacidades, en consecuencia, tienen que ser altamente variables.

Si lo expresado anteriormente es elemental y básico al pensar sobre este tema, todavía se olvida frecuentemente que ha habido que apelar á la vaga expresión de capacidad "normal" ó "nominal" para dar alguna posibilidad á la idea, con el fin de ocultar nuestra incompetencia para expresar en números la verdadera capacidad existente.

Generalmente la expresión capacidad normal se refiere principalmente á la planta de moler sin referencia á la capacidad en fabricación. Bajo las condiciones usuales de operación, la planta de moler es tal vez la menos afectada en su tarea total por cambios en la calidad de la caña. Al hacer ésta afirmación no debe interpretarse que la calidad no tiene influencia sobre la capacidad de los molinos, toda vez que es de todos conocido el efecto de la paja, de la cantidad y calidad de la fibra, de las diversas variedades y de otros factores no bien definidos pero incluídos bajo el concepto general de "facilidad de molienda." Sin embargo, éstos factores diversos usualmente son constantes todos los días en determinado central azucarero, por tanto el efecto total para una fábrica en particular no es de gran trascendencia.

Siendo éste el caso estamos justificados en fijar la medida de la capacidad de molienda de un central azucarero en particular basando nuestra medida en la experiencia.

En el departamento de fabricación el asunto es bastante diferente y los efectos de la calidad variable de los jugos son muy pronunciados. En este caso estamos imposibilitados á referirnos á ninguna capacidad normal ó nominal á menos que la fijemos como la capacidad de manejar la tarea óptima de molienda bajo las condiciones menos favorables en la calidad del jugo.

Si no se satisfacen éstas condiciones óptimas en el diseño del departamento de fabricación, la definición de capacidad normal no tiene significado. Sin un conocimiento exacto de la capacidad de fabricación con relación á la capacidad de los molinos por una parte y á la capacidad de organización en el campo y en el transporte de la otra parte, resulta extremadamente difícil, si nó imposible, analizar las pérdidas de tarea con la finalidad de determinar los medios para mejorar las condiciones de operación en el futuro.

La finalidad de éste trabajo técnico es suministrar tales medios para determinar las variaciones en la capacidad de fabricación, asignando las pérdidas en la tarea ó capacidad de molienda á los respectivos departamentos. A los fines del análisis del tiempo perdido, las pérdidas por departamentos pueden ser subdivididas, cargando el verdadero tiempo perdido por cada unidad de dicho departamento.

El concepto básico de ésta proposición es "Pérdida de Tonelaje," ó dicho brevemente LT. Su definición:

"Pérdida de Tonelaje (LT) = Tonelaje Máximo (MT) — Tonelaje Verdadero Molido," donde Tonelaje Máximo (MT) es una cifra calculada basándose en ciertas medidas fijas determinadas precisamente para cada fábrica en particular.

Hasta donde la proposición que consideramos contempla aquellos casos en que la capacidad conocida de molienda excede la capacidad de fabricación, estrictamente para ésta finalidad, no es necesario definir con exactitud la medida de la capacidad de molienda.

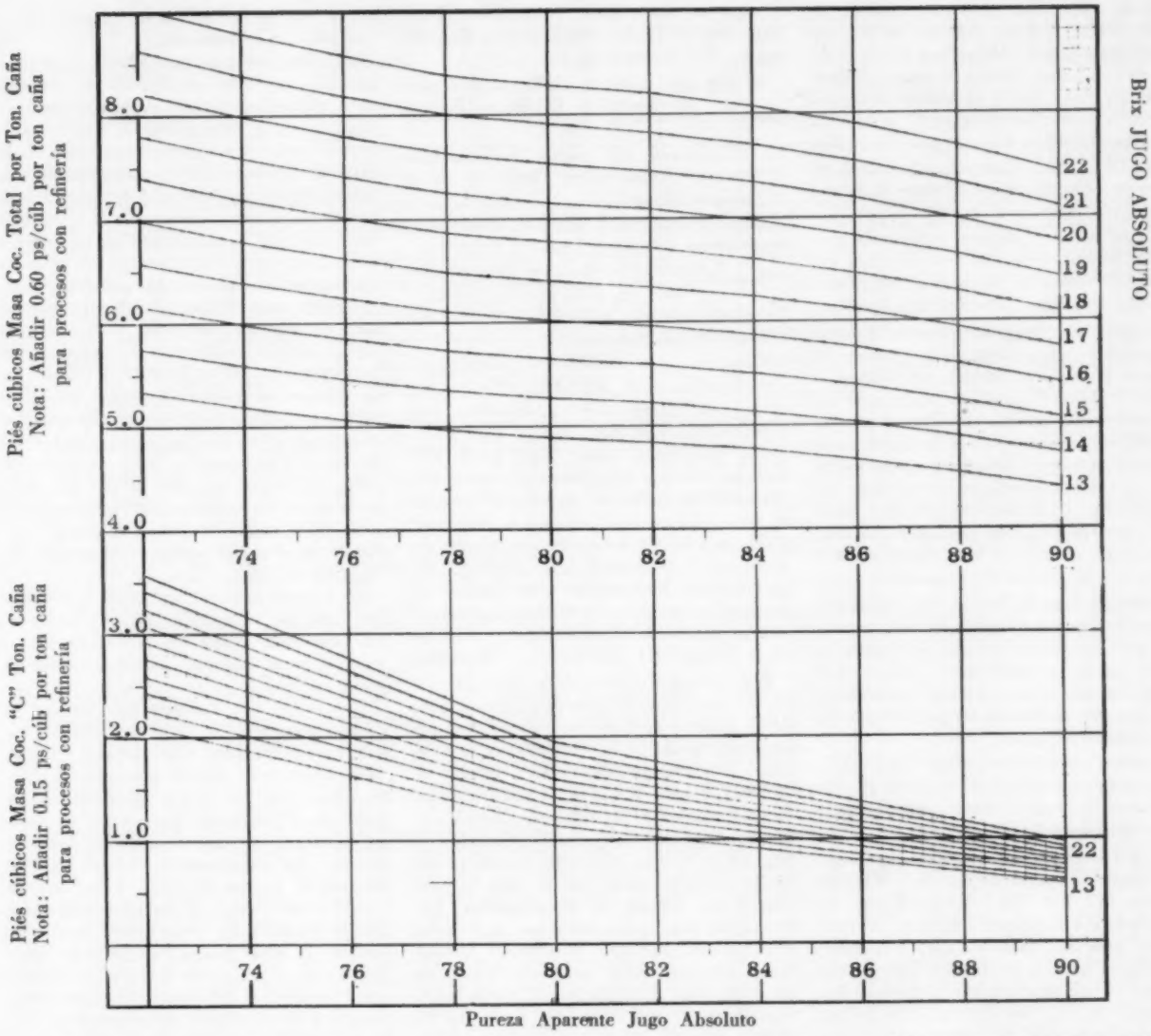
Sin embargo, en el caso de una fábrica con varios tandems los cuales tienen una capacidad normal de molienda de, digamos 15,000 toneladas de caña por día y una capacidad variable de fabricación de digamos 10,000 á 16,000 toneladas de caña por día; y asumiendo que bajo algunas condiciones extraordinarias impuestas la fábrica tiene que funcionar antes de que la reparación y acondicionado de todos los tandems se haya terminado, es obvio que resultaría falso calcular la Pérdida de Tonelaje (LT) tanto á base de la cifra de capacidad de 15,000 TC de los molinos como á base del Máximo Tonelaje (MT) de la capacidad de fabricación, si en realidad los tandems realmente en operación tienen una capacidad que no excede de 9,000 toneladas de caña por día.

Por eso y para satisfacer tales eventualidades lo conveniente es asignar normas ó velocidades fijas para el tandem ó cada uno de los tandems. Estas normas se asignan mejor á base de la experiencia. El autor no conoce fórmulas aplicables á todos los molinos que permitan determinar capacidades exactamente; excepto las que se derivan de la experiencia.

Naturalmente cualquier sección del Departamento de Fabricación es capaz de crear un cuello de botella. Lo mismo es cierto con respecto á cualquier unidad de maquinaria de una sección; por ejemplo, si la bomba de los calentadores de jugo está pordebajo de la capacidad de los calentadores, no podremos moler á capacidad. Hay que asumir que la fábrica ha sido adecuadamente diseñada en todos éstos aspectos.

Sin embargo, hay estaciones que varían mucho más ampliamente en capacidad que otras, porque son influídas por la calidad de los jugos más que por la cantidad.

Estas estaciones del Departamento de Fabricación son los tachos y las centrífugas, especialmente las de bajo grado. Otras estaciones tales como los evaporadores, son principalmente afectadas por la cantidad más que por la calidad. Incluiremos aquí los clarificadores, los cuales resultan afectados por ambos: calidad y cantidad, y por tanto no es posible dar valores absolutos á los efectos de las variaciones de calidad.




Procedimiento para Estimar Máximo Tonelaje—MT

(1) Determinar Masacocida Total/TC

(2) Determinar Masacocida "C"/TC

(3) Total Masa/TC menos Masa "C"/TC = Masas A & B/TC

(4) Vol Tachos por TC para A&B = A&B Masa TC x 0.147

(5) Vol Tachos por TC para C = C Masa/TC x 0.245

(6) Suma de (4) y (5) = Volúmen Total Tachos Reqd/-TC = $P^r$

(7) Luego MT Tachos = Volúmen Real Tachos = $\frac{16{,}000}{P^r}$

(8) MT y Centrífugas "C" = $\frac{\text{Cap. Centrif. Pies Cu./Día}}{\text{Pies Cu Masa "C"/TC}}$ = $\frac{22{,}000}{\text{Pi Cu "C"/TC}}$

En nuestras observaciones sobre la capacidad de fabricación nos vamos á limitar á las capacidades de los tachos y centrífugas de bajo grado; porque en la fábrica en que se hicieron éstas observaciones y las representaciones gráficas, dichas estaciones constituían los cuellos de botella. Todas las estaciones restantes de éste central azucarero en particular disponen de capacidades adecuadas para resistir tareas en exceso sobre las posibilidades en tachos y centrífugas de agotamiento.

Al mismo tiempo que tratamos sobre los tachos y centrífugas de bajo grado, resulta evidente que otras estaciones, los evaporadores por ejemplo, puede asignárseles capacidades tipo, pudiendo el lector ver cuan fácilmente puede hacerse ésto toda vez que la capacidad está mucho más relacionada á la cantidad.

Antes que podamos estimar el potencial de éstas estaciones en toneladas de caña por día, debemos, antes que nada, determinar la cantidad de masa cocida que hay que manipular, y asignando valores justos sobre la capacidad de nuestros equipos para manejar tales cantidades, podremos determinar la capacidad potencial en términos de toneladas de caña por día.

Por ejemplo, supongamos á las centrífugas con capacidad para manipular 10,000 pies cúbicos de masa cocida de bajo grado por día; si el jugo es de una calidad que rinde 1.0 pie cúbico de masa cocida "C" por tonelada de caña, el potencial de ésta estación es de 10,000 toneladas de caña por día. En cambio, si la calidad del jugo rinde 2.0 pies cúbicos de masa cocida "C" por tonelada de caña, entonces la capacidad potencial baja á 5,000 toneladas de caña por día.

En forma similar para los tachos. Asumamos jugos de diferentes características; pero ambos rindiendo 7 pies cúbicos de total de masas cocidas por tonelada de caña. En el caso A tendremos 1 pié cúbico

de masa cocida "C" y 6 pies cúbicos de masas cocidas A & B; mientras en el caso B tendremos 2 pies cúbicos por tonelada de caña de C y 5 pies cúbicos de masas cocidas A & B. Es obvio que, si el tiempo requerido para la cocción de templas C es mucho mayor que el que se necesita para las masas cocidas A & B; conigual capacidad de tachos el potencial de los mismos en menos en el caso B que en el caso A.

Es esencial que podamos estimar la producción de masas cocidas con bastante exactitud si vamos á estimar la capacidad potencial de tachos y centrífugas.

Se supone que el gráfico 1 permite hacerlo exactamente, refiriendose á la producción de masa cocida en función del brix y la pureza del jugo extraído. La representación gráfica fué trazada mediante una combinación de consideraciones teóricas y de medidas reales de cantidades de masa cocida bajo condiciones ampliamente variables de los jugos por un período de dos años en el central azucarero con el cual está asociado el autor. El sistema de tres masas cocidas está en uso en éste central azucarero.

Es posible leer fácilmente los volúmenes de masa cocida por tonelada de caña usando éstos gráficos. Estos valores son para la fábrica citada en particular; pero tal vez pudieran usarse con confianza para otros casos, aunque aplicando los porcentajes de corrección necesarios.

El gráfico incluye correcciones para fábricas de crudos con refinería; es obvio que las mismas se aplican á tales centrales azucareros en particular.

En el encabezamiento tambien aparece: "Procedimiento para Estimar el Máximo Tonelaje MT/por Día." Tambien ésto se aplica solo a determinadas fábricas en particular; pero los cálculos para cualquier otra pueden hacerse fácilmente. Los puntos (1) (2) (3) se explican por sí mismos. En los puntos (4) (5) los volúmenes de tachos por tonelada de caña se derivan de la ecuación siguiente: Cap. Volumétrica Necesaria en Tachos/Ton Caña:—

$$\frac{\text{Pies Cúb. Masas/TC x Horas de Cocción}}{24}$$

En el caso de masas cocidas A&B con factor 0.147 éste se deriva de:

$$\frac{\text{Horas de Cocción}}{24} = 0.147,$$

por consiguiente las Horas de Cocción son 3.528.

En el caso de masas cocidas "C" con factor 0.245, las Horas de Cocción son 5.88,

$$\text{v.g. } \frac{5.88}{24} = \text{Factor} = 0.245$$

Estas horas de cocción tipo ó standard para distintas masas cocidas pueden asignarse á discreción teniendo en mente la práctica seguida usualmente, la eficiencia de los tachos y otras variables peculiares de cada fábrica.

Habiendo obtenido la Cap. Volumétrica Necesaria en Tachos para varias masas cocidas segun (4) y (5), sumamos para obtener la Capacidad Volumétrica Total Necesaria en Tachos por Tonelada de Caña segun (6), denominada $P^v$.

El tonelaje máximo (MT) se obtendrá por $\frac{\text{Cap. Volumétrica Existente Tachos.}}{P^v}$

En el ejemplo del gráfico la Capacidad Volumétrica Existente en Tachos se dá en 16,000 pies cúbicos.

Para estimar MT en las centrífugas necesitamos solamente:

$$MT = \frac{\text{Capacidad Centrífugas Pies Cúb/día}}{\text{Pies Cúb. M.C. por Ton. Caña}}$$

En el ejemplo del gráfico MT de las centrífugas "C" es dado como

$$\frac{22{,}000}{\text{Pies Cúb. M.C. "C"/TC}}$$

en el cual 22,000 = la capacidad en centrífugas Pies Cúb/día.

Por tratamiento preferencial de la Pérdida de Tonelaje queremos significar la distribución del tonelaje perdido, adjudicado en forma inequívoca, de manera preferente y con antelación, de modo que resulte inmaculado y equitativo para todos los departamentos interesados. Este asunto se presenta á veces, y hasta frecuentemente, siendo orígen de controversias y disputas entre los molinos, fabricación y el campo.

Por ejemplo, el jefe de maquinaria necesita, aunque nó de inmediato, una parada de los molinos para ciertas reparaciones que requieren varias horas. Se aprovecha la oportunidad de una prevista escasez de caña en el batey debida á que la próxima entrega está retrasada; y en todo caso habrá que disminuír la marcha para dar tiempo á la llegada de la caña. Al propio tiempo el jefe de fabricación aprovecha la parada para limpiar un equipo de evaporadores. Las lluvias se han interpuesto con la cosecha del día, sin embargo el jefe de campos tiene bastante caña para entregarla en otros chuchos ó estaciones de carga, para reemplazar el lote retrasado, si el jefe de tráfico sitúa los carros extra necesarios en tales chuchos. En un complejo caso como éste ú otro parecido, hay que hacer un tratamiento preferencial del tiempo perdido. La Pérdida de Tonelaje es tal vez la única buena solución.

El siguiente es el orden de sucesión ú orden preferencial para distribuír la Pérdida de Tonelaje:

(a) Planta de Moler, propiamente dicha
(b) Manipulación de la caña
(c) Fábrica, otros conceptos excepto los anteriores
(d) Causas exteriores relacionadas con la fábrica
(e) Transporte—falta de caña
(f) Campo—falta de caña

A los efectos del reporte de fabricación, los epígrafes a-b-c-d se cargan á la fábrica en cuanto se refiera á Pérdida de Tonelaje. Para el análisis final de éstas pérdidas con respecto á las unidades individuales del equipo, los porcentajes de tiempo perdidos por cada unidad se asignan de acuerdo contra el total de la Pérdida de Tonelaje (LT) cargada al departamento.

El valor mayor del procedimiento es para aquellos centrales azucareros de relativa gran capacidad tirando su abasto de caña desde muy variables fuentes ó regiones, susceptibles de características extremas en la calidad. Generalmente la capacidad de molienda excede la capacidad de fabricación; por tanto el conocimiento de la verdadera capacidad del departamento de fabricación es lo único que permitirá saber las pérdidas ocasionadas por inadecuado abasto de caña.

La expresión de ésta pérdida en números, v.g., en toneladas de caña, es mucho más satisfactoria, que hacerlo en términos de horas perdidas; si en realidad la pérdida de tiempo por los molinos obedece á que fabricación no pudo procesar mayor tonelaje. Por el contrario, los molinos pueden haber reducido su tarea para ajustarla al abasto de caña; cuando en realidad fabricación pudo procesar mayor tonelaje. En el primer caso sería falso cargar al campo el tiempo perdido y en el segundo caso sería igualmente falso no hacerlo.

La hoja de trabajo para llevar la Pérdida de Tonelaje se muestra en el Cuadro I. En general la tabulación se explica por sí misma; pero algunas partidas requieren explicación.

Las líneas 1 á 4 tienen que ver con el central azucarero en particular citado y no son apropósito para este trabajo. En una fábrica con tres tandems funcionando prácticamente todo el año es imposible hacer todas las reparaciones necesarias, en todos los tandems, durante el corto período inactivo; las reparaciones deben hacerse durante el tiempo de zafra. Tales reparaciones en ese tiempo no pueden considerarse tiempo perdido. En consecuencia hemos inventado la frase "Horas Funcionando" para denominar el tiempo de operación y trabajo para distinguirlo del tiempo sin-operaciones debido á la temporada de reparaciones.

Este concepto tambien se extiende abarcando interrupciones en cualquier tandem debidas á causas fuera de control, que hacen innecesaria la operación del tercer tandem. Las operaciones totales se definen mejor con la expresión Horas Funcionando % de Horas Totales y el Tiempo Perdido en operaciones expresado como % de Horas Funcionando. Se pueden descartar las líneas 1 á 4 inclusives y consideraremos solo las líneas 5 á 15.

La líne 5 es el Tonelaje Máximo MT calculado para los tachos y centrífugas "C" conforme se indica en el gráfico y texto arriba. El mas bajo del MT se usa en cualquiera de los casos, siempre que dicha cifra sea mayor que la molienda real efectiva. Cuando la molienda real efectiva excede ó es igual al MT calculado no hay Pérdida de Tonelaje LT y por esto el MT se pone igual á la molienda real efectiva.

Las líneas 6—7 y 8 se explican por sí mismas. La línea 9, "Horas Perdidas Corregidas excluyendo Falta de Caña" es el

CUADRO I — HOJA SOBRE PERDIDA DE TONELAJE — Semana No. Desde — Hasta

| | FECHA / DIA DE ZAFRA | | 80 | 81 | 82 | 83 | 84 | 85 | 86 | Semana | Anterior | Hasta la fecha |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Molino, Horas Trabajando | 72 | 72 | 72 | 72 | 72 | 48 | 48 | 456 | 4,740 | 5,196 |
| 2 | | Molino, Horas No-Trabajando | - | - | - | - | - | 24 | 24 | 48 | 948 | 996 |
| 3 | 1 + 2 | Molino, Horas Totales | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 504 | 5,688 | 6,192 |
| 4 | 1 ÷ 3 | Hrs.Trabaj. % Horas Totales | 100 | 100 | 100 | 100 | 100 | 66.7 | 66.7 | 90.5 | 83.3 | 83.9 |
| 5 | | Tonelaje Máximo Calculado | 13,400 | 15,000 | 12,000 | 15,000 | ~~13,500~~ 14,000 | ~~12,000~~ 12,000 | ~~12,000~~ 12,000 | 93,400 | 1,027,000 | 1,120,400 |
| 6 | | Tonelaje Efectivo Molido | 12,000 | 10,000 | 11,000 | 8,000 | 14,000 | 10,000 | 9,000 | 74,000 | 790,000 | 864,000 |
| 7 | 5 - 6 | Pérdida de Tonelaje | 1,400 | 5,000 | 1,000 | 7,000 | None | 2,000 | 3,000 | 19,400 | 237,000 | 256,400 |
| 8 | 5 ÷ 24 | Tonelaje Máximo Vel/Hora | 558.3 | 625.0 | 500.0 | 625.0 | 583.3 | 500.0 | 500.0 | 556 | 542 | 543 |
| 9 | Report ÷ 3 | Horas Perdidas Excl Falta Caña | 1.33 | 2.00 | 2.50 | 0.33 | ~~2.99~~ 0 | 1.50 | 1.00 | - | - | - |
| 10 | 9 x 8 | Pérdida Tonelaje Excl Falta Caña | 743 | 1,250 | ~~1,359~~ 1,000 | 206 | ~~1,166~~ 0 | 750 | 500 | 4,449 | 48,000 | 52,449 |
| 11 | 7 - 10 | Pérdida Tonelaje por Falta Caña | 657 | 3,750 | 0 | 6,794 | 0 | 1,250 | 2,500 | 14,951 | 189,000 | 203,951 |
| 12 | Report ÷ 3 | Hrs.Perd.Falta Caña - Tráfico | 1.67 | 2.25 | ~~0.5~~ 0 | 1.00 | 0 | 0 | 0 | - | - | - |
| 13 | 12 x 8 | Pérdida Tonelaje F. Caña-Tráfico | ~~932~~ 657 | 1,406 | 0 | 625 | 0 | 0 | 0 | 2,688 | 24,000 | 26888 |
| 14 | 11 - 13 | Pérdida Tonelaje F. Caña-Campos | - | 2,344 | 0 | 6,169 | 0 | 1,250 | 2,500 | 12,263 | 165,000 | 177,063 |
| 15 | 7 - 11 | Pérdida Tonelaje - Fábrica | 743 | 1,250 | 1,000 | 206 | 0 | 750 | 500 | 4,449 | 48,000 | 52,449 |

AJUSTE SEMANAL

| | | |
|---|---|---|
| MT de la Carta x 7 - MT Semana | 93,400 | |
| Menos Deduccion Limpieza Semanal | Ninguna | (Nota) A) |
| MT Corregido para la Semana | 93,400 | Entra en Linea 5 - Columna Semana: Recalcular Semana COLUMNA MARCADA* |

No se requiere hacer ninguno toda vez que el tonelaje molido es menos que 75,000 TC

Nota A: Deducir 7000 TC por limpieza de final de semana si al hacerlo las MT por semana no quedan reducidas a menos de 75,000 TC. De lo contrario deducir correspondiente menor TC.

tiempo perdido real reportado por todas las causas excepto falta de caña, dividido por el número de tandems funcionando, segun los ejemplos 3 ó 2.

Las líneas 10 y 11 se explican por sí y la 12 es el tiempo perdido corregido debido al tráfico y tratado en la línea 9. Las líneas 13, 14 y 15 completan el record y por sí se explican.

En el central azucarero en particular á que se refiere éste ejemplo, se ha encontrado práctico limpiar los evaporadores sobre la marcha en la corrida, siempre que la molienda semanal no exceda de 75,000 de TC. Toda vez que MT es un estimado del potencial diario, el potencial semanal ó el ajuste y reconciliación debe ser ajustado para conceder la Pérdida de Tonelaje producida por la necesidad de parar ó reducir la marcha de la molienda á causa de la anteriormente citada operación. La nota explicativa al pie se explica por sí misma y las cifras corregidas, si asi fuera necesario para hacer este ajuste, se muestran en la columna "Semana," sustituyendo aquellas obtenidas por la adición de las cifras diarias.

En el Cuadro I se muestra un ejemplo del registro. Debe notarse que no se permiten números negativos. Por ejemplo: En el día 80 el resultado en la línea 13 habría dado 932, resultando —275 en la línea 14. Por ésto la línea 13 se corrige á 657 dando así un resultado cero en la línea 14.

Otra vez, si el tonelaje real molido excede al Tonelaje Máximo MT calculado, resultaría una Pérdida de Tonelaje negativa. En muchos casos el MT se pone igual al tonelaje real molido y no hay Pérdida de Tonelaje, v.g., en el día 84.

En los días 85 y 86 del ejemplo se muestra el procedimiento para manejar este asunto cuando todos los molinos no están funcionando. Digamos el caso en que debido á fuertes lluvias con pérdida de trabajo en el campo resulta improbable que las entregas de caña durante la semana siguiente ó aun más, puedan asegurar la posible operación de los 3 tandems; habiendose decidido parar enteramente el trabajo de uno de los tandems.

Esta decisión resulta en que solo dos tandems quedan trabajando, con 2 x 24 ó 48 horas de operación por día y 24 horas sin-operación. El departamento de fabricación puede procesar en exceso de la capacidad de los dos tandems, nominalmente 12,000 TCD. Por tanto, la cifra de 12,000 ó MT sobre dos tandems, debe usarse en vez de las 14,000.

Si la capacidad de fabricación excede la capacidad de los molinos, puede aceptarse la denominada capacidad nominal de los molinos; y si la planta de moler trabaja á máxima tarea todo el tiempo, entonces la definición de Tiempo Perdido como por ciento del Tiempo Total Aprovechable es el dato verdadero de las pérdidas debidas á paradas; pudiendo definirse con exactitud las diversas causas de tales paradas.

Tales condiciones se encuentran con rareza en la práctica; es mucho más común encontrar centrales azucareros fuera de balance que fábricas balanceadas. Es condición característica del abastecimiento de caña ser muy variable de lote á lote y segun progresa el período de la zafra. Toda vez que los equipos solo pueden diseñarse para condiciones específicas, resulta que la capacidad potencial cambia con los cambios en la calidad de la caña.

Se ha preparado un gráfico modelo para calcular, á base del brix y pureza de los jugos en proceso, la producción de masas cocidas por TC. Se han tenido en cuenta aquellos equipos que son afectados en su potencial por cambios de cantidad por unidad de caña, con cualidades variables en los jugos.

De ésto se deriva la capacidad potencial de la fábrica, aplicando valores verdaderos sobre capacidades basados en la experiencia.

Sabiendo el Máximo Tonelaje MT, podemos llegar á un estimado de la Pérdida de Tonelaje LT deduciendo ó restando el Tonelaje de Molienda Real Efectivo del Tonelaje Máximo MT calculado.

Esta Pérdida de Tonelaje se trata preferentemente y se carga á los tres grupos departamentales: Campo, Transporte y Fábrica. Si se desea se hace una subdivisión, cargando los porcientos de tiempo perdido á las diveras unidades de cada departamento.

La ventaja del concepto de la Pérdida de Tonelaje resulta de la posibilidad de expresar numéricamente, en la expresión familiar de unidades de toneladas de caña, las pérdidas efectivas de tonelaje ó tarea de molienda. No basándose en el vago término de capacidad nominal, sino en una capacidad mas precisa y verdadera basada en mejores datos é influenciada por las variables en la calidad de la caña.

Estimo que las representaciones gráficas de la Pérdida de Tonelaje son mas útiles y valiosas para el análisis del problema, así como instrumentos de referencia siempre á la mano.

# Nueva Idea sobre el Sostenimiento del Vacío en los Tachos

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**Publicamos éste artículo en Español bajo permiso especial del Autor; ya que ha sido publicado con anterioridad solamente en Inglés.**

**Además, el tema es original, útil y elevadamente autorizado por el prestigio internacional de Mr. Webre. *Editor.***

El sostenimiento de un vacío satisfactorio en los tachos es indispensable para poder producir cristales de azúcar libres de conglomerados y grano fino y con tamaño uniforme. No deben haber variaciones ú oscilaciones durante la operación, porque seguramente sobrevendrán dificultades. La finalidad de éste trabajo es sugerir medios sencillos para resolver éste problema.

Una forma bastante segura es suministrando condensadores independientes para cada tacho; siendo ésta la práctica aceptada actualmente, aunque todavía hay muchos centrales azucareros con condensadores centrales para todos los tachos y todos los evaporadores. Aunque la experiencia ha demostrado que los condensadores independientes ayudan mucho, aún ocurren oscilaciones cada vez que se conecta ó pone á trabajar un tacho, aún usando una bomba de vacío separada para levantar el vacío inicial.

Una vez que el tacho empieza á trabajar se tiene que llevar á evaporación completa durante tiempo apreciable para lograr estabilidad con la bomba auxiliar de vacío antes de conectarlo al sistema central de vacío. Operando de éste modo se pueden extraer el aire y gases contenidos en el tacho al empezar su trabajo, y cuando se comunica su condensador al sistema general no hay aire y gases, resultando el mínimum de perturbación. Pero es muy difícil conseguir que los operadores se ajusten á ésta técnica; generalmente hacen el cambio de la bomba auxiliar de vacío al sistema general tan pronto el vacío alcanza 20″ ó 22″, en tanto que los tachos restantes están trabajando bajo un vacío de 26″ á 27″.

El resultado es una caída de 2″ ó 3″ de vacío en el sistema general. Despues de un rato se restablece la normalidad y los tachos vuelven á su vacío original, y es aquí donde se presenta el peligro. La masacocida ha sido recalentada á causa de la caída de vacío y el cambio á un vacío más elevado provoca la correspondiente evaporación "flash" ó instantánea. El enfriamiento subsiguiente llevará la sobresaturación mas allá de la zona metaestable, provocando la formación de conglomerados y granos finos, dañando la calidad del azúcar.

Un error muy común con los sistemas de vacío central es hacer demasiado grandes las conexiones de la bomba de vacío. Esto dá por resultado que el condensador que tiene menos vacío es el que recibe la cantidad máxima de gases incondensables, y el condensador con el vacío más alto recibiendo el mínimo, cuando debe ser justamente todo lo contrario. En alguno ingenios ha sido mejorada ésta situación utilizando un tubo de paso de 2″ alrededor de la válvula de vacío de cada condensador, operando con la válvula grande cerrada y la válvula del tubo de paso abierta. Esto permite trabajar con 27″ en los tachos de agotamiento ó bajo grado; y con 23″ ó 24″ en los tachos para templas de alto grado, todo con una sola bomba de vacío.

Desde luego es posible usar condensadores eyectores, los cuales no necesitan bomba de vacío, tales como las unidades de condensadores á chorros-múltiples. La dificultad es que la diferencia final puede ser tan alta como 15 á 25 grados Fahrenheit; y ésto significa tener que usar más agua que la que requiere un buen condensador á contra-corriente, cuya diferencia final nunca excede de 5 grados Fahrenheit. Además éstos condensadores á chorros-múltiples son diseñados para trabajar con cierta cantidad de agua, y cuando se reduce ésta para ajustarla á cargas menores, aumenta la diferencia final, bajando la eficiencia proporcionalmente. Aceptando sus desventajas conocidas, éstos condensadores trabajan muy bien verdaderamente; y no necesitan bomba de vacío. El resultado de éstos condensadores es un vacío independiente por completo para cada tacho, libre de interrupciones.

El problema puede y ha sido resuelto en algunos centrales azucareros con una bomba de vacío para cada condensador. Despues de todo ésta fué la forma y solución original; pero el costo inicial y los gastos de mantenimiento de una bomba de vacío para cada condensador son considerables. Por tanto, la práctica general aceptada ha sido una bomba grande de vacío central para todos los condensadores y una mas pequeña para levantar el vacio en los tachos al comienzo del trabajo.

Algunos ingenios resuelven el problema usando bombas de vacío á chorro de vapor: una para cada condensador de los tachos. El vapor utilizado por ésta bombas hay que descargarlo á la atmósfera, y como está contaminado con gases resulta inadecuado para otros usos. Por tanto puede constituír un consumo considerable de calor. No hay problema si hay gran sobrante de vapor directo; de no ser así hay que investigar cuidadosamente el consumo de vapor directo de éstas bombas antes de decidir usarlas. Su consumo puede ser tan alto como 800 libras por hora cada uno, y hasta más si no tienen intercondensadores.

Las bombas de vacío hidráulicas independientes ofrecen máxima sencillez, seguridad y bajo costo inicial, entre sus grandes ventajas; aunque su uso no ha sido ampliamente establecido. A continuación tratamos sobre su diseño y operación.

La bomba de vacío hidráulica se concibió originalmente en un caso de emergencia para sustituír una bomba de vacío Nash que se rompió y servía tres filtros rotativos Oliver de 8′ x 16′. Esta primer unidad fué construída en el taller de un central azucarero é instalada en unas dos semanas. Sirvió los tres filtros de cachaza citados sin dificultad. Despues se extendió á otros ingenios con el mismo fin. Luego se probó como bomba auxiliar para levantar el vacío inicial en los tachos. Por último fué probada, con los mas satisfactorios resultados, como bomba de vacío independiente para condensadores.

El dibujo ilustra el diseño de una bomba de éste tipo que servirá un condensador de un tacho al vacío de 14′ 0″ de diámetro trabajando bajo condiciones tropicales. Su sencillez resulta clara á primera vista.

El cuerpo consiste principalmente de avíos de tubos con una T de 14 pulgadas en posición vertical. En la base de ésta T se ajusta un reducido de 14″ x 6″, conectandose una columna barométrica de 6″ y no menos de 32 pies de largo, con el extremo debidamente sumergido en el tanque ó bache.

En la rama del costado de la T de 14″ se atornilla un platillo con agarradera que sirve de acceso para inspecciones á mano. En la otra rama de la T se provee una conexión de 6 pulgadas para vacío.

Al extremo superior de la T de 14″ se suelda ó atornilla una placa de acero,

barrenada y con roscas para ajustar siete atomizadores de agua con orificios de 7/8".

Arriba tiene una T de 8 pulgadas y los atomizadores construídos de bronce con ocho pulgadas de largo.

Por el otro lado de la T hay otro agujero para la limpieza á mano y para reemplazar los atomizadores.

En la parte de arriba de la T de ocho pulgadas hay un reducido de 8" x 6", con una válvula de seis pulgadas para dar entrada de agua con una presión no menor de 20 libras en los atomizadores.

La parte interior de éstos atomizadores de agua debe estar pulimentada.

Los siete atomizadores de agua están distribuídos en forma simétrica y los chorros de agua chocan exactamente dentro del espacio de seis pulgadas de diámetro de la columna barométrica. Esto debe ser comprobado observando á través de la rama del costado de la T de 14 pulgadas, quitando la cubierta y acometiendo el agua sobre la bomba de vacío hidráulica.

Las condiciones de operación asumidas son 20 libras de presión del agua en los atomizadores y 26 pulgadas de vacío en la T de 14 pulgadas. La carga hidrostática total sería.

| | |
|---|---|
| 20 Lbs. de presión en la cubierta de los atomizadores .... | 46.5 pies |
| 26 pulgadas de vacío en la T de 14 pulgadas ..... | 29.9 " |
| Carga total en los atomizadores | 76.4 " |
| Gals./minuto por atomizador de 7/8" ..... | 124 |
| Gals./minuto para siete atomizadores ..... | 868 |

Lo que se expresa arriba es para una bomba hidráulica de vacío.

Para una fábrica completa de azúcar se necesita una bomba hidráulica de vacío para cada uno de los condensadores de los tachos, una bomba para el condensador del evaporador y una bomba para formar vacío rápidamente en los tachos al comenzar á trabajar. Si hay cuatro tachos ésto significa que hacen falta seis bombas hidráulicas de vacío, que requieren en conjunto 5,208 galones de agua por minuto. Por tanto se sugiere una bomba con capacidad para 6,000 galones por minuto, la cual tiene algun margen de seguridad.

Con respecto á la carga de ésta bomba, damos el siguiente estimado de acuerdo con las condicones:

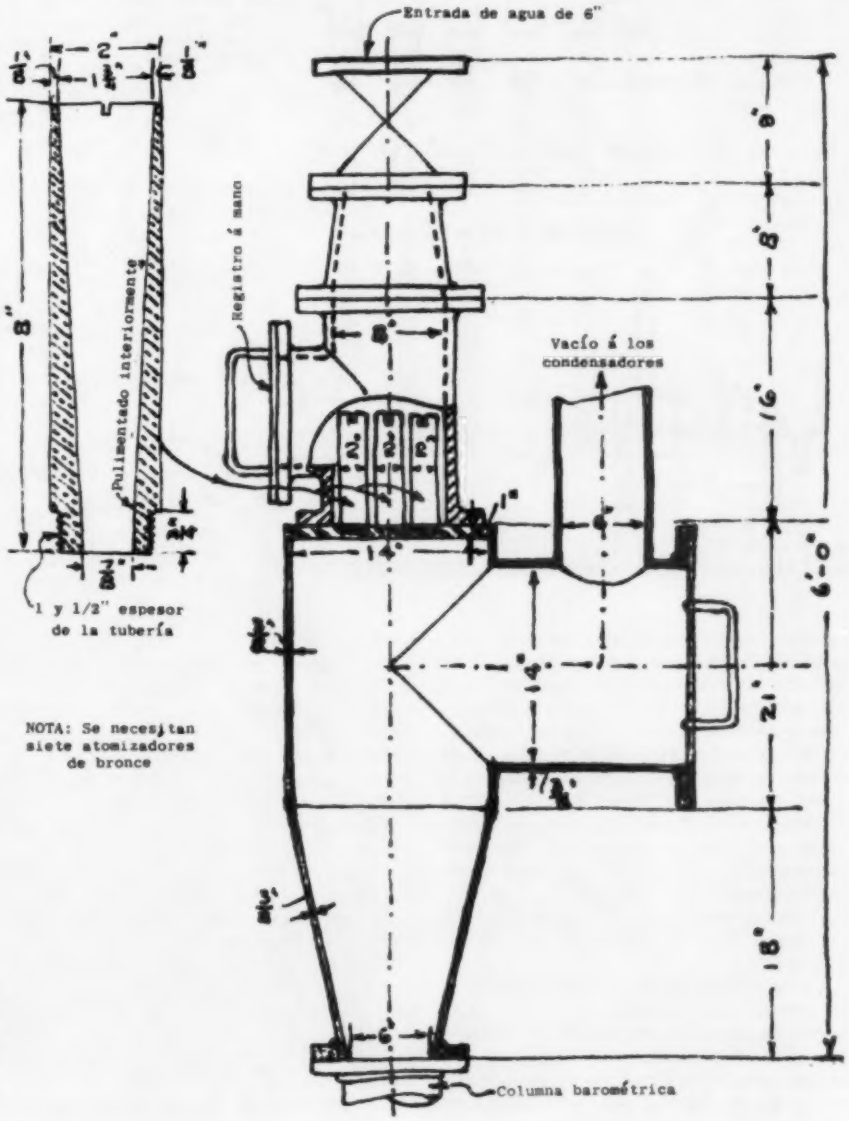
| | |
|---|---|
| 20 Lbs. de presión ..... | 45.6 pies |
| Cargo estática desde el nivel del agua en el tanque al nivel de atomizadores ..... | 36.0 " |
| Adicionando por fricción en tuberías ..... | 8.4 " |
| Carga total ..... | 90.0 pies |

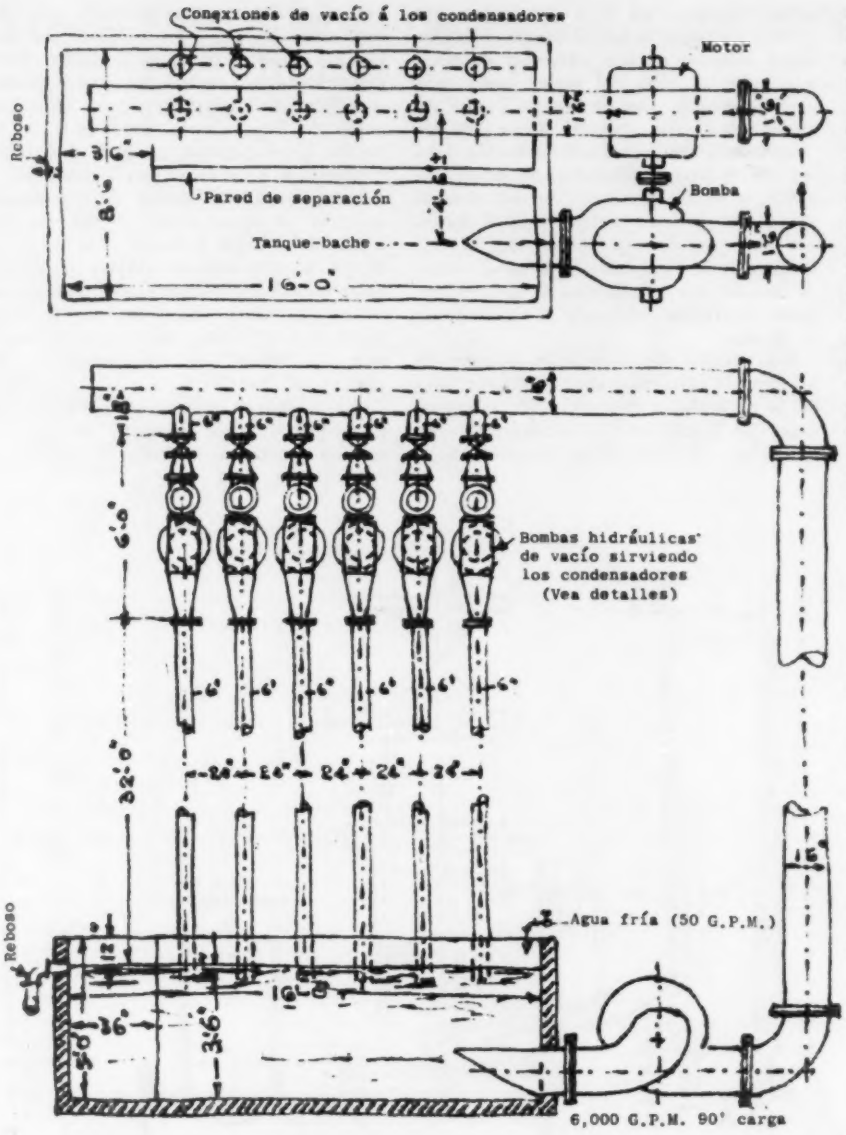
Por tanto la bomba de agua de circulación que sirva las seis bombas hidráulicas de vacío debe tener una capacidad de 6,000 G.P.M. contra 90 pies de carga.

Estas seis bombas hidráulicas de vacío deben montarse en linea integrando una unidad compacta sobre el tanque ó bache, cuyos costados quedan alrededor de cinco pies sobre el nivel del suelo; conectando directamente la succión de la bomba de circulación de agua dentro de uno de los extremos del tanque. La construcción debe ser de concreto, alrededor de 8' 6" de ancho, y 16' 0" de largo, con una división en el centro, desde arriba hasta el fondo, con tres pies de espacio por detrás. Las bombas de vacío se instalan sobre el centro de una división y la bomba de agua extrae desde el extremo del frente al otro lado de la división.

Esta disposición pone toda el agua de las bombas hidráulicas de vacío en un lado de la partición, y tiene que dar la vuelta dentro de la otra sección del bache y seguir al extremo del frente, hasta la succión de la bomba. Tambien ésto permite que las burbujas de aire descargadas por las bombas hidráulicas de vacío suban libremente hasta la uperficie del agua y queden completamente liberadas en la atmósfera antes de llegar hasta la succión de la bomba de circulación, la cual se trabaría ó fallaría si nó se toma ésta disposición.

Normalmente la bomba de circulación succiona el agua desde el extremo del frente del tanque ó bache y la descarga dentro de una tubería vertical, pasándola hasta un colector ó cámara de alimentación horizontal sobre la línea de bombas hidráulicas de vacío, alimentando á cada una á través de su admisión de agua de 6". Esta agua, al circular á través de las bombas de vacío, eleva gradualmente su temperatura por la mezcla de gases y vapores que vienen de los condensadores y






pronto resulta demasiado caliente para permitir el adecuado funcionamiento de las bombas hidráulicas. Para resolver ésta dificultad se debe alimentar continuamente una pequeña cantidad de agua fresca al tanque ó bache cerca de la succión de la bomba de circulación. Hay un reboso en la pared posterior del bache, que descarga á la zanja, desalojando una cantidad equivalente de agua y manteniendo un nivel constante. La cantidad de agua fría usada aquí es entre 50 a 100 G.P.M., ó menos, mientras la temperatura del agua que vá á las hidráulicas no excede de 90 grados Fahrenheit.

En el cuerpo de cada bomba hidráulica se provee un manómetro de vacío, haciendose la conexión con una T en la línea, atornillándole un obturador de ¼" con un agujero de 1/16". El objeto es suministrar una pequeña fuga de aire para salvar la tendencia á producirse un peligroso martillo ó golpe de agua en la columna barométrica, cuando se cierra la válvula para vacío al condensador, al parar el tacho correspondiente.

Debe haber tambien un manómetro de presión en la cubierta de los atomizadores de cada bomba hidráulica de vacío.

Relacionaremos algunas de las características mas notables de éste sistema:

1) Cada tacho es completamente independiente para el mantenimiento de su vacío, el cual permanece absolutamente estable, sin interferencias de ninguna clase.

2) No hay partes movibles que puedan desajustarse, requieran lubricación, reparaciones ó causar inconvenientes de ninguna clase.

3) Las bombas hidráulicas de vacío se atienden por una sola bomba centrífuga de circulación de agua, cuya succión está siempre sumergida. En realidad ésta bomba tiene su cuerpo á un nivel inferior al del agua en el tanque; por tanto no tiene que cebarse nunca.

4) Los gases incondensables se extraen desde vacío completo, á la presión atmosférica, por la acción de chorros de agua fría, los cuales condensan la parte de evaporación de la mezcla y comprimen los gases isotérmicamente. En lugar de hacerlo adiabáticamente, resultando con ésto mucho menor volúmen á manipular por las bombas de vacío.

5) Una característica muy interesante es el hecho de que si un golpe de agua viene, el cual destrozaría una bomba ordinaria de vacío; en cambio no afectaría de ningun modo éstas nuevas unidades hidráulicas.

6) No hay reparos ni inconvenientes para éste equipo; excepto que es nuevo y no ha sido ampliamente establecido en la industria azucarera.

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## Discusión Sobre Análisis de Carbón en el Grupo Zerban

"Interpretación de los Análisis de Carbón Animal" fué el muy interesante tema tratado por el Dr. Frank G. Carpenter, del Plan de Investigaciones sobre Carbón Animal, del National Bureau of Standards, en el almuerzo mensual del grupo Zerban de Azucareros, en Enero 11 último. La reunión se celebró en el Chemists Club de Nueva York, asistiendo un número excepcional de técnicos de refinerías. En la discusión que sobrevino quedó establecido el punto: que muchos de los ensayos convencionales tienen bastante menos significado del que se les atribuye.

■

## Cuba Ofrece Mieles á los Compradores de EE.UU.

Con más de 200 millones de galones de mieles finales disponibles para exportación éste año, el Instituto Cubano del Azúcar se ha acercado á los compradores de los EE.UU. ofreciendo entregar toda la producción en una sola operación de venta, segun un reporte del Wall Street Journal. La venta más reciente fué por 25 millones de galones á una firma Británica á diez centavos por galón. Hay razones para creer que los compradores de los Estados Unidos no están interesados en recibir las mieles Cubanas ofrecidas. Aunque las mieles no están al presente afectadas por las disposiciones que impiden las importaciones de azúcar, hay especulaciones en el sentido de que la Administración de Kennedy pueda ampliar el embargo á otros productos Cubanos aparte del azúcar. Además, lo más importante es que los compradores puedan encontrar dificultades en la descarga de las mieles en los puertos de los EE.UU. si los trabajadores rehusan manejar las mismas.

# Oficiales y Presidentes de Comités que Organizan la 20a. Reunión Anual de la S.I.T.

El grupo fotografiado en las páginas 00-00 incluye oficiales, presidentes de comités y el comité ejecutivo de los Técnicos de la Industria Azucarera (S.I.T.), quienes se reunirán para el acto de apertura de la 20a. Reunión Anual el Domingo 7 de Mayo próximo. A continuación de las reuniones iniciales de trabajo de los distintos grupos, todos los miembros de la organización y sus esposas están invitados á una recepción al mediodía del Domingo. Los siguientes dos días se dedicarán á la presentación y discusión de trece trabajos importantes sobre el proceso de azúcar de remolacha y la refinación de crudos de la caña; asistiendo técnicos de los Estados Unidos y varios países extranjeros. Al final de las sesiones tendrá lugar un symposium sobre los problemas técnicos actuales. El banquete anual se celebrará en el mismo lugar de las reuniones: el Hotel Sheraton Atlantic, en Nueva York. Se recomienda á los miembros ponerse en contacto con cualesquiera de los oficiales que aparecen en ésta información para obtener detalles sobre la reunión.

■

### La Cuban-American Continuará Operaciones en los EE.UU.

Apesar de la confiscación de la parte más substancial de sus propiedades en Cuba, la Cuban-American Sugar Company con toda probabilidad continuará sus operaciones en los Estados Unidos, expresó David M. Keiser, Presidente de la junta directiva, en la reunión anual de la empresa. A través de su subsidiaria, la Colonial Sugar Company; la Cuban-American opera la refinería en Gramercy, Louisiana. Además, la compañía posee el 90% de las acciones de la Industrial Sugars, con una planta para azúcar líquido en San Luis (Missouri) y el 23% de las acciones de la American Crystal. La Compañía está apremiando reclamaciones legales en varios países extranjeros enderezadas á recuperar sumas resultantes de las ventas de azúcares procedentes de sus propiedades confiscadas en Cuba. Mr. Keiser manifestó "que no hemos abandonado nuestras esperanzas de reanudar algun día nuestras operaciones en Cuba."

■

### El Servicio de Personal de Sugar y Azúcar tiene nuevas oficinas

Dicha oficina, operada por Leffingwell/-Asociados, está ahora situada en el grupo de locales 411 del nuevo Edificio Queen Street, en 235 South Queen Street, Honolulu. Este recién construído edificio de siete plantas, completamente equipado con aire acondicionado, está situado cerca del centro de operaciones de la industria azucarera en la ciudad capital de Hawaii.

■

### Azucareros de Experiencia Disponibles para Empleo

El Servicio de Personal de SUGAR y AZÚCAR, el único servicio internacional de ésta índole para la industria azucarera, informa que dispone de cierto número de hombres calificados excepcionalmente y disponibles en la actualidad para ocupar posiciones ejecutivas.

Este servicio internacional ha estado funcionando por un año. Es la única agencia central modernamente organizada para suministrar á las administraciones azucareras el personal que necesitan. Si hay urgente necesidad de llenar una vacante los arreglos pueden tratarse por cable ó por teléfono de larga distancia.

En la actualidad hay personas de la más alta calidad y capacidad disponibles para desempeñar los siguientes cargos:

- Ingeniero-Jefe
- Superintendente de Fabricación
- Supervisor de Fábrica
- Ingeniero de Ventas & Servicios
- Director de Relaciones Laborales
- Contador

El personal altamente calificado y de experiencia que busca nuevas posiciones en la industria azucarera pueda llenar y presentar sus solicitudes al Servicio de Personal de SUGAR y AZÚCAR. Sin embargo, al hacer nuestra recomendación para ocupar un cargo hacemos el máximo esfuerzo para encontrar el hombre que necesita la empresa. Esta persona puede estar en la relacion de personal disponible, ó empleado por otra compañía é interesado en una nueva oportunidad.

Los honorarios por el servicio prestado se cargan solamente á la empresa azucarera. Representa el diez por ciento de la retribución anual de la persona que ha sido empleada. No hacemos ningun cargo al individuo contratado ni por aparecer en lista.

Las entidades ó personas interesadas en el Servicio de Personal de SUGAR y AZÚCAR pueden dirigirse á Roy J. Leffingwell, Administrador, P. O. Box 4034, Honolulu 12, Hawaii. Por teléfono á Honolulu 67-677, ó por cable á "PanPub," Honolulu.

*Esparciendo hierbicidas en campos de Luce & Company en Puerto Rico.*

# Grandes Planes de Expansión Azucarera para la Florida

INTENSA actividad cercana á proporciones de ague repentino resultan evidentes para la industria azucarera de la Florida. Se reporta que $40 millones de dólares ya han sido destinados á la construcción de nuevos centrales azucareros y refinerías solamente en la Florida, inspirados en la suspensión de restricciones sobre áreas cultivables, la caótica situación de Cuba y el hecho de que las áreas Continentales de caña no han cubierto su cuota durante los ultimos años. Los precios de la tierra cultivable han subido en las regiones donde se siembra caña.

La U. S. Sugar Corporation ha anunciado un programa de expansión de $20 millones de dólares. La Corporación construirá una refinería asociada á partes iguales con la Savannah Sugar Refinery Corporation. La refinería se instalará cerca de Canal Point y estará lista para la primavera de 1962. La U. S. Sugar Corporation construirá en el mismo lugar un nuevo central azucarero para azucares crudos. Cuando se termine su instalación ésta empresa añadirá 140,000 toneladas á su producción actual.

Okeelanta, que adquirió la fábrica azucarera en Fellsmere hace algun tiempo, se propone invertir $10 millones de dólares para ampliar capacidad durante los próximos dos ó tres años.

En Belle Glade, Florida, la Florida Sugar Corporation, propiedad de antiguos intereses azucareros Cubanos ha sembrado 2,000 acres de caña de azúcar y ha empezado á instalar al antiguo central azucarero Evangeline, desmantelado en St. Martinville, Luisiana y embarcado á la Florida.

Se han hecho estudios para la construcción en ésta misma área de otro central azucarero cooperativo. Segun "The Miami Herald", Harry T. Vaughn, presidente de la U. S. Sugar Corporation, pronostica que la producción azucarera de la Florida saltará desde la presente cifra de 175,000 toneladas á 260,000 toneladas dentro de dos años y á 320,000 toneladas en tres años.

Otros proyectos azucareros en la Florida se anunciarán despues que pase en el Congreso la nueva legislación azucarera. Hay la firme creencia de que la cuota de la Florida será aumentada substancialmente con el advenimiento de la nueva legislación azucarera. La Florida está representada en los Comités de Agricultura de ambos cuerpos legislativos por el Senador Spessard L. Holland y el Represenante D. R. Matthews. Las posibilidades de expansión son formidables; se estima que en los Everglades solamente, hay 300,000 acres de tierras potencialmente cultivables de caña de azúcar.

■

### Consejo Internacional Azucarero

El Consejo Internacional Azucarero celebrará su Novena Sesión durante la semana de Febrero 20 para considerar la situación creada por la suspensión del Contrato No. 4 por la Bolsa de Azúcar y Café de Nueva York. Este contrato proveía las bases de estipulación de precios sobre las cuales operaba el Acuerdo. La Novena Sesión tomará la decisión final sobre las cuotas iniciales de exportación al mercado libre para 1961.

■

### Ésteres Surfactantes del Azúcar

En un folleto recientemente publicado por el Sugar Research Foundation, Inc. se exponen las propiedades de los ésteres surfactantes del azúcar y se sugieren métodos para su preparación. Los estudios realizados sobre sus usos indican que los ésteres poseen aplicaciones potenciales sobre alimentos, productos farmacéuticos, cosméticos, aceites secantes y productos del petróleo. Pueden obtenerse copias de éste folleto escribiendo á la Fundación, 52 Wall Street, New York 5, New York, U. S. A.

■

### Nueva Planta para Industrializar Bagazo en Brasil

Se encuentran en la fase final los proyectos relativos á la instalación de una fábrica de planchas de fibra de bagazo: "Bagatex" en la ciudad de Carpina, Pernambuco, Brasil. La iniciativa se debe á un grupo de azucareros dispuestos á realizar substanciales inversiones destinadas á dar nuevas aplicaciones al bagazo de la caña de azúcar, segun el "Brasil Azucareiro."

La localización de la fábrica en Carpina se decidió por factores favorables: proximidad á dos centros de materia prima, facilidades de transporte y agua á poca profundidad del suelo.

El "Bagatex," sin similares en su género, contará con la exención de los impuestos estatales y municipales; confiando obtener otros incentivos oficiales.

Se espera que la fábrica empiece á funcionar dentro del primer trimestre de 1961, elaborando en su primer etapa veinte toneladas mensuales de "Bagatex," para las cuales hay mercado potencial en la región.

■

### La West Indies Sugar Reclama $30 Millones de Dólares á Cuba

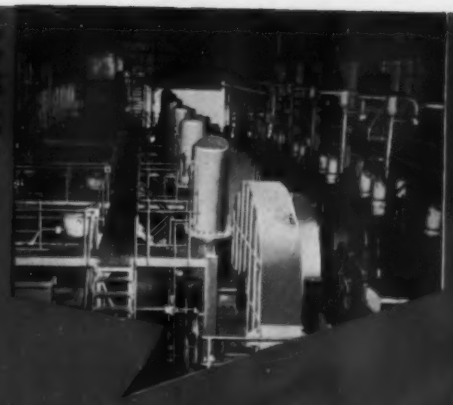
La West Indies Sugar Corporation ha establecido reclamaciones por más de 30 millones de dólares contra el Gobierno de Cuba. Organizada en 1932, la compañía ha operado en Cuba y en la República Dominicana. Segun un reporte del Wall Street Journal, las propiedades azucareras Dominicanas fueron vendidas en 1957 por 35 millones de dólares. Las propiedades en Cuba consisten en cuatro grandes ingenios azucareros con una capacidad anual de 325,000 toneladas cortas de azúcar crudo y 246,000 acres de tierras. El Gobierno de Cuba se apoderó de éstas propiedades. Los accionistas votaron la liquidación de la Compañía en Febrero de 1960. Segun el Sr. Thomas N. Tarleau, Presidente, la compañía actualmente no realiza negocios excepto la protección de sus reclamaciones.

■

### Bedoy se Asocia a la Fulton Iron Works

El Sr. Alfonso G. Bedoy, Jr., un Ingeniero Químico, ha sido asociado a la organizacion de la Fulton Iron Works como Auxiliar del Jefe de Ventas de la División Azucarera. Dedicará la mayor parte de su tiempo a ampliar el servicio de la Fulton a sus clientes de la America Latina. Mr. Bedoy ha estado conectado anteriormente, por mucho años, a la Compañía Link-Belt; habiendo viajado extensivamente por México, América Central y el Caribe.

FLETCHER en Central Boca Chica, en la República Dominicana, compuesto de 13 molinos de 34" x 66", movidos por turbinas de vapor.

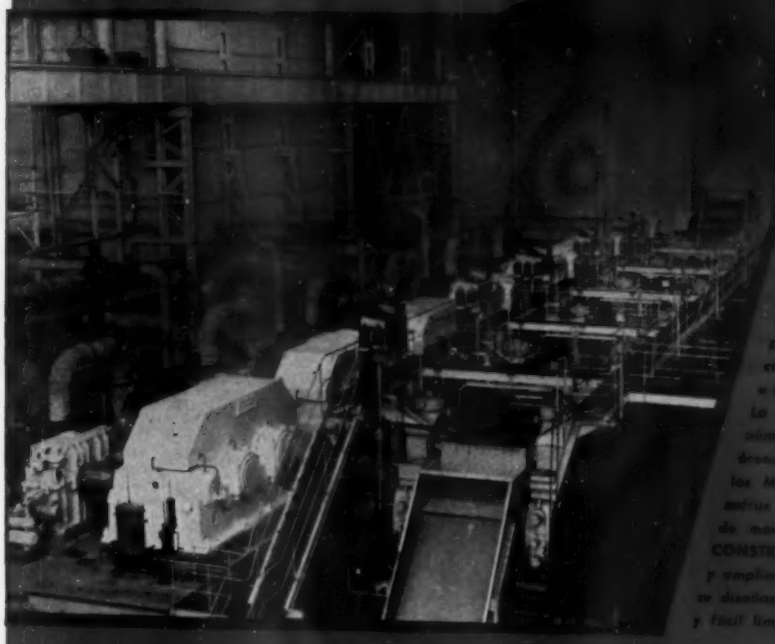


Planta de Molar FLETCHER en la fábrica azucarera de la Ganga Sugar Corporation, en Deoband, Provincias Unidas, India, compuesta de 18 molinos de 32" x 60", movidos por turbinas de vapor.

# FLETCHER

Las últimas instalaciones FLETCHER de una planta de molar de 18 molinos de 34" x 66", movidos por turbinas de vapor e incluyendo los conductores intermedios centrífugos de banda plana de goma.

## molinos para caña de azucar



Esta planta de molar es el resultado de mas de 100 años de experiencia en la construcción de maquinaria azucarera—es el producto de discusiones, sobre el terreno, con los mas distinguidos tecnólogos azucareros e ingenieros de molinos de caña en todo el mundo. La indudable reputación de este equipo y el número de instalaciones realizadas en todas las áreas azucareras justifican nuestra afirmación que los Molinos Fletcher pueden realizar las mas duras pruebas azucareras por muchos años con costos mínimos de mantenimiento. Los Molinos Fletcher, de CONSTRUCCION ROBUSTA, lubricación bien planificada y amplias superficies de fricción en los chumaceras, se diseñan además para ofrecer completa accesibilidad y fácil limpieza.

La firma FLETCHER realiza instalaciones completas de fábricas de azucar de caña y de azucar de remolacha—Tambien refinerías de azucar—Modernización de fábricas existentes—Ampliaciones—Renovaciones—Equipos para Lavar Caña—Cuchillas de Cortar Caña—Desfibradores Maxwell—Molinos Fletcher—Tambores de Metal Alfin, especial para molinos—Básculas Maxwell Boulogne para pesar líquidos—Calentadores de Jugo—Clarificadores Fletcher—Filtros-prensa—Evaporadores con Tubo Central Sellado—Tachos al Vacío de corriente central—Bombas de Vacío y de Gas $CO_2$—Cristalizadores Fletcher—Bombas "Amarilla", rotativas por desplazamiento, para masas cocidas y líquidos viscosos—Equipos para Manejo de Azucar a Granel—

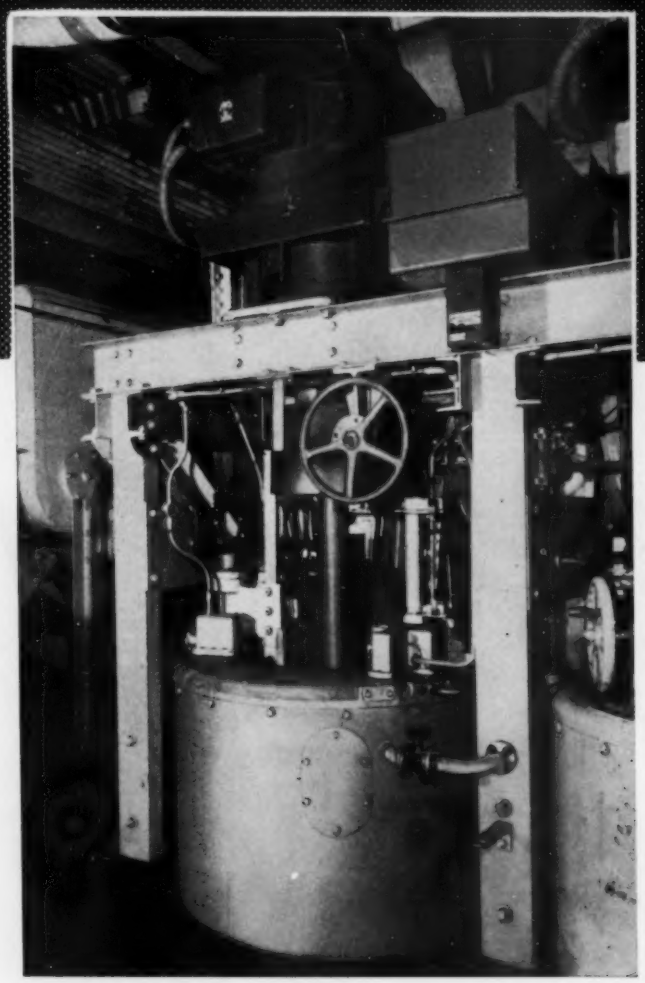
FLETCHER

GEORGE FLETCHER & CO LIMITED

MASSON WORKS LITCHURCH LANE DERBY ENGLAND

TELEFONO DERBY 45814 (4 LÍNEAS) TELEX 37514 TELEGRAMAS "AMARILLA", DERBY

# CENTRÍFUGAS COMPLETAMENTE AUTOMÁTICAS



Nuestro último diseño de una Centrífuga Completamente Automática ofrece plena automatización en el campo de la centrifugación. No hay problemas de adiestramiento de personal; no es necesario dejar margen para los fallos humanos. Cada fase del ciclo puede ser pre-regulada según el tipo de azúcar a ser tratada.

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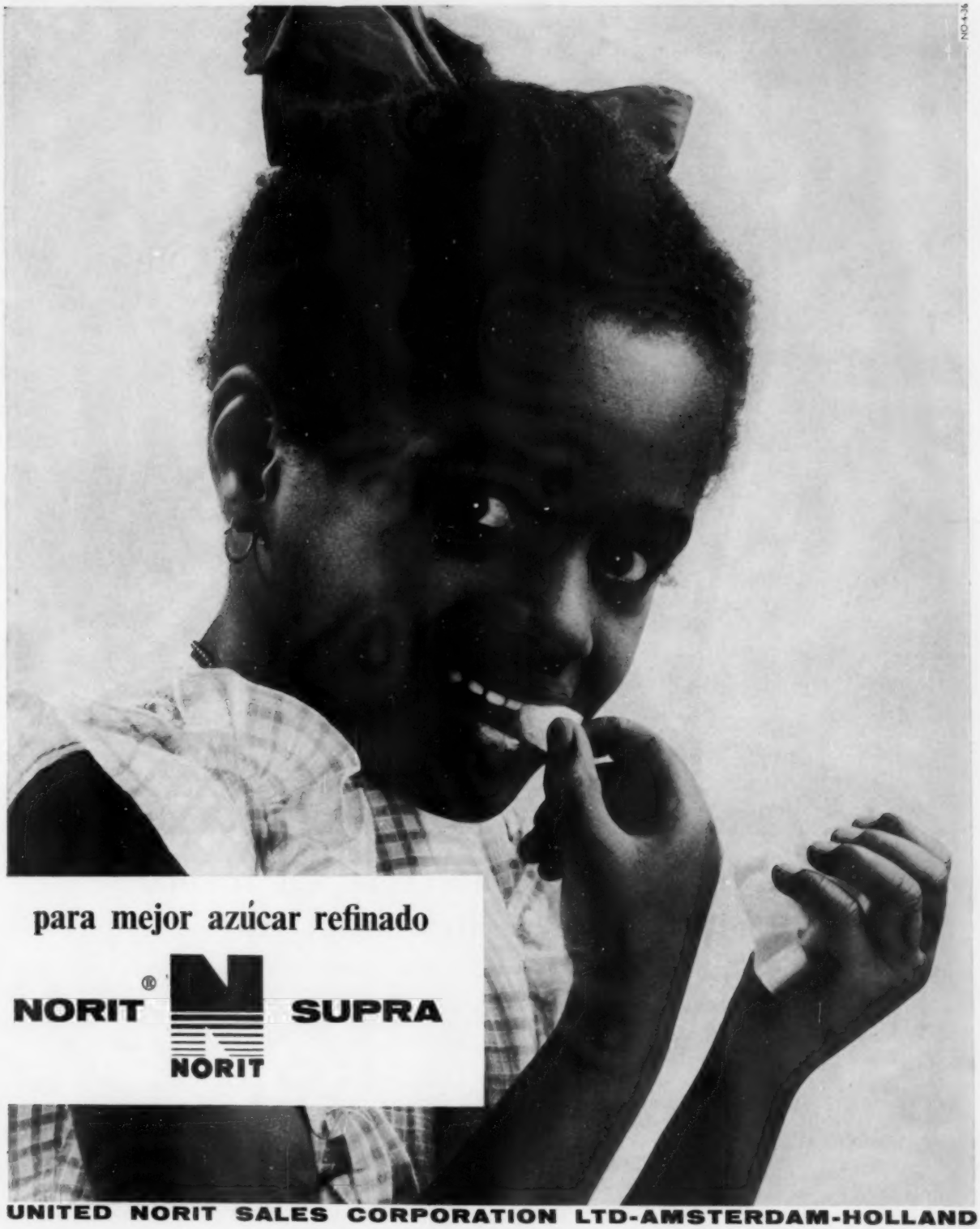


UNITED NORIT SALES CORPORATION LTD-AMSTERDAM-HOLLAND

# Azúcar libre de bacterias, en menos tiempo, con Filtración Celite

Las bacterias termofílicas son eliminadas completamente de los azúcares de caña y de remolacha cuando se usan los auxiliares filtrantes diatomáceos Celite®. Y con la rápida velocidad de flujo Celite, el proceso entero de filtración se acelera desde el comienzo hasta el final. Velocidades de flujo aún mayores pueden obtenerse combinando la defecación cal-ácido fosfórico con la Filtración Celite. Esta combinación además reduce el fallo del carbón animal ó del carbón vegetal activado por acumulación de impurezas y suciedad y añade los beneficios de una decoloración parcial.

Celite se extrae de canteras conteniendo los depósitos más puros y se elabora y embarca desde la planta diatomácea más grande del mundo. Esta fuente de abastecimiento todo-en-una-sola-unidad, cuidadosamente explotada y controlada, permite ofrecer un abasto uniforme y continuo de todos los grados, standard y especiales, de auxiliares filtrantes. Todo eso garantiza resultados de alta eficiencia dondequiera y todas las veces que Vd. use Celite. Actualmente entre los distintos grados de auxiliares filtrantes Celite se incluye Celite Perlite. Vea Vd. al más próximo Ingeniero de Filtración J-M para detalles ó escriba á: Johns-Manville, Box 14, New York 16, N.Y. En el Canadá: Port Credit, Ontario. Cable: Johnmanvil.

*Los auxiliares filtrantes de la División Celite, cuando se usan como tales, no son considerados aditivos alimenticios segun está determinado por el Acta Enmendada FD&C, Sección 201(s).*

JOHNS-MANVILLE JM

# CONDUCTORES INTERMEDIOS FARREL DE BANDAS DE GOMA

*han demostrado ser más limpios y más duraderos en las instalaciones realizadas desde 1952*

Las 54 instalaciones hechas desde 1952 han demostrado que los conductores intermedios Farrel de bandas de goma son ciertamente superiores á los del tipo convencional de tablillas y cadenas. Reportes procedentes de los clientes que los usan demuestran que el mantenimiento de éstas simples unidades es casi desconocido y nulo, su funcionamiento más limpio, con mejor retención del bagazo é imbibición.

Por ejemplo, el primero de éstos conductores fué instalado en el Central Plata, de Puerto Rico, en 1952. Se ha usado durante seis zafras moliendo dos y medio millones de toneladas de caña. Segun el ingeniero-jefe Rafael Labiosa: "Ni un sólo minuto de tiempo se ha perdido debido á fallas mecánicas del conductor de goma ó del resto de los componentes de éstas unidades." La banda de goma, que aún está en condiciones de usarse, se conserva como repuesto.

El funcionamiento y resultados de la banda de goma es sorprendente si Vd. piensa que tenía solamente 1/16" de cubrimiento ó envoltura de goma por la cara de transporte y acarreo. Las unidades subsiguientes suministradas por Farrel tienen un ⅛" de cubrimiento de goma.

El conductor patentado Farrel ha sido diseñado para reemplazar fácilmente un conductor ordinario de tablillas durante una corta parada. La banda de goma sinfín tiene abrazaderas de goma en la parte de arriba, cada seis pulgadas, para la mejor alimentación del molino.

Escriba por una información y cotización, segun las necesidades de su instalación.

Uno de los Conductores Intermedios Farrel de bandas de goma en uso en el Central Plata, Puerto Rico.

FARREL ®

**FARREL-BIRMINGHAM COMPANY, INC.**
**ANSONIA, CONNECTICUT, U.S.A.**

Fábricas en Ansonia y Derby, Conn.; Búfalo y Rochester, N. Y.

FB-1202

# Extractos de Publicaciones Azucareras

**Publicados bajos los Auspicios de la**

**Sociedad Internacional de Tecnólogos Azucareros de Caña**

**por Arreglo Especial con**

**SUGAR y AZÚCAR—Profesor Mario A. Mascaró, Redactor**

## Agronomía

### Factores a Considerar sobre el Equipo de Atomización para la Aplicación Apropiada de Polvos Hierbicidas en Campos de Caña

*Por* MANUEL MEJÍA VALENTIN

Los acontecimientos de los últimos años sobre control químico de hierbas han suministrado a la industria azucarera nuevos medios eficientes para reducir los costos de cultivo. Pero si se hace una adecuada seleccion de los productos químicos a usar, de las fechas correctas de tratamiento y de más cuidadosa supervision de las técnicas de atomización, se pueden obtener aún menores costos en el control de las malezas. Si consideramos todos los demás factores iguales, la adecuada selección y eficaz uso del equipo de aplicacion de los productos químicos será lo que habrá de determinar la diferencia entre un control eficiente y a bajo costo ó el fracaso de la operacion. Se atribuye con mas frecuencia a los productos químicos el fracaso, olvidandose los errores en la técnica del tratamiento.

En los campos de Puerto Rico se encuentran tres distintos tipos de equipos: en aeroplano, montados o tirados por tractor y equipos portátiles al hombro. Cada uno tiene su uso específico de acuerdo con el terreno, sistema de siembra, etc. Ciertas características deben tenerse presente en cada tipo. Estos factores incluyen: capacidad adecuada de la bomba para el tipo de aplicación deseada; apropiada y suficiente agitación dentro del tanque, especialmente cuando se usan polvos hierbicidas humectantes tales como las Ureas Sustituídas; válvulas de control de acción rápida y positiva; y atomizadores de tamaño adecuado para dispersar el volúmen deseado. El equipo debe ser adecuadamente calibrado y el personal de supervisión debe vigilar constantemente que los operadores no hagan ajustes que no esten autorizados.

■

### B H C para el Control del Gusano-Alambre (Wireworm)

R. W. MONTGOMERY, *Boletin Trimestral de los Cultivadores de Caña*, Vol. 23, p. 65 (1959)

Se ha encontrado que se puede proteger la germinación de la caña contra el ataque de los gusanos "wireworms" por medio de la aplicacion de 10 lb. de B H C al 20%, por acre, dentro de los surcos. Como una cantidad tan pequeña, para el área citada, es difícil de aplicar; el polvo debe mezclarse con 326 lbs. de fertilizante. El B H C crudo en concentraciones altas afecta adversamente el crecimiento de las raíces, por lo que se recomienda impedir el contacto inmediato del producto químico. La distribución correcta se efectúa por medio de varios dispositivos adaptados al tubo de descarga del equipo distribuidor de fertilizantes, permitiendo poner una pequeña cantidad de tierra antes de la mezcla de B H C-fertilizante. Esta ligera capa de tierra protege contra el daño que pudiera causar la mezcla B H C-fertilizante; y no obstante, permite al insecticida ejercer en forma completa su accion contra los gusanos.

■

### El Equipo Massey Ferguson para Cortar Caña Hace Historia en Australia

ROY DICKSON, *Producers Review*, Vol. 49, No. 11, pp. 7, 11 (1959)

El nuevo Equipo Massey Ferguson para Cortar Caña, que ha sido diseñado para cortar la caña, eliminar el cogollo y subdividir despues los tallos en pequeños trozos; se puso a trabajar bajo un contrato para cortar alrededor de 7,000 toneladas de caña en el distrito del Rio Herbert. Al terminar la operación la máquina había cortado caña a razón de 538 toneladas por semana con un promedio de 7 a 8 horas de trabajo cada día. La "Operacion Corte de Caña" ha resultado un éxito destacado y se afirma que los fabricantes han dado a la industria azucarera de caña lo que hace mucho tiempo venía buscando: una máquina que corte la caña aún en los casos de ser una masa enredada reposando sobre el suelo.

■

### Reporte sobre el Progreso en las Prácticas de Cultivo en el Central Aguirre

*Por* WILLIAM S. BARNES

El Central Aguirre desarrolla una activa investigación para mejorar sus métodos de cultivo.

Se han hecho estudios para el avalúo de las ventajas de la inyección profunda del aqua ammonia en comparación con las prácticas actuales en los campos del ingenio.

Se han hecho tambien pruebas en el campo para observar y medir los resultados sobre prácticas de grada-cruzada. Esta operación de cultivo se hace en campos de caña muy nueva para alisar y suavizar la contextura del campo, erradicar el crecimiento precoz de las malezas y promover una mejor germinación. Esta operación es seguida de una aplicación de aqua ammonia. Inmediatamente despues de eso el campo recibe una aplicacion aérea de hierbicida. De ese modo confiamos poder establecer un control completo sobre las malezas.

Otros estudios sobre cultivo están en proceso para mejorar la forma de regadío, el drenaje y la efectividad de las resiembras.

Finalmente se está dando especial atención a los equipos agrícolas de cultivo para obtener la eficiencia máxima.

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| En América Central, América del Sur, Cuba, Haití, República Dominicana, Africa del Sur, Filipinas y Formosa, por los distribuidores de J. R. Geigy S. A., Basilea (Suiza), como | **Gesatop 50 M** |
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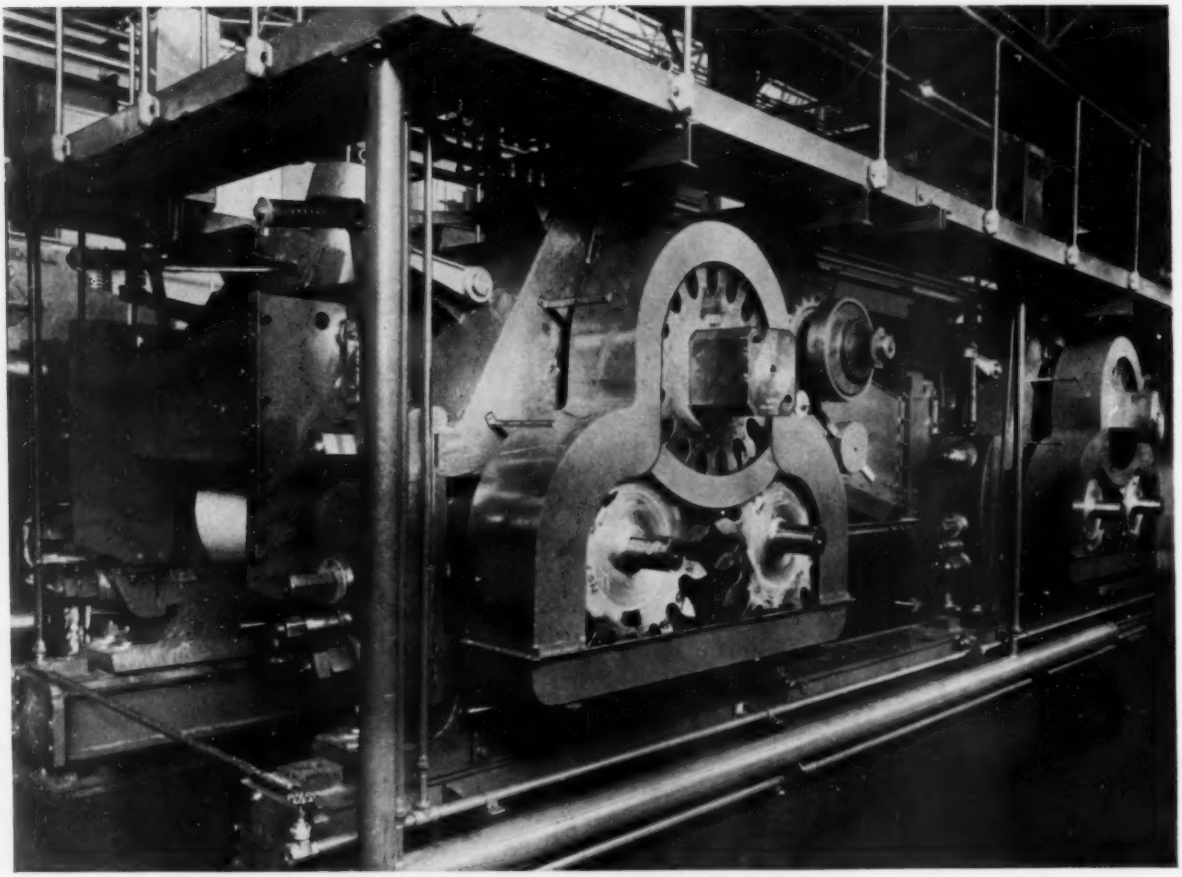

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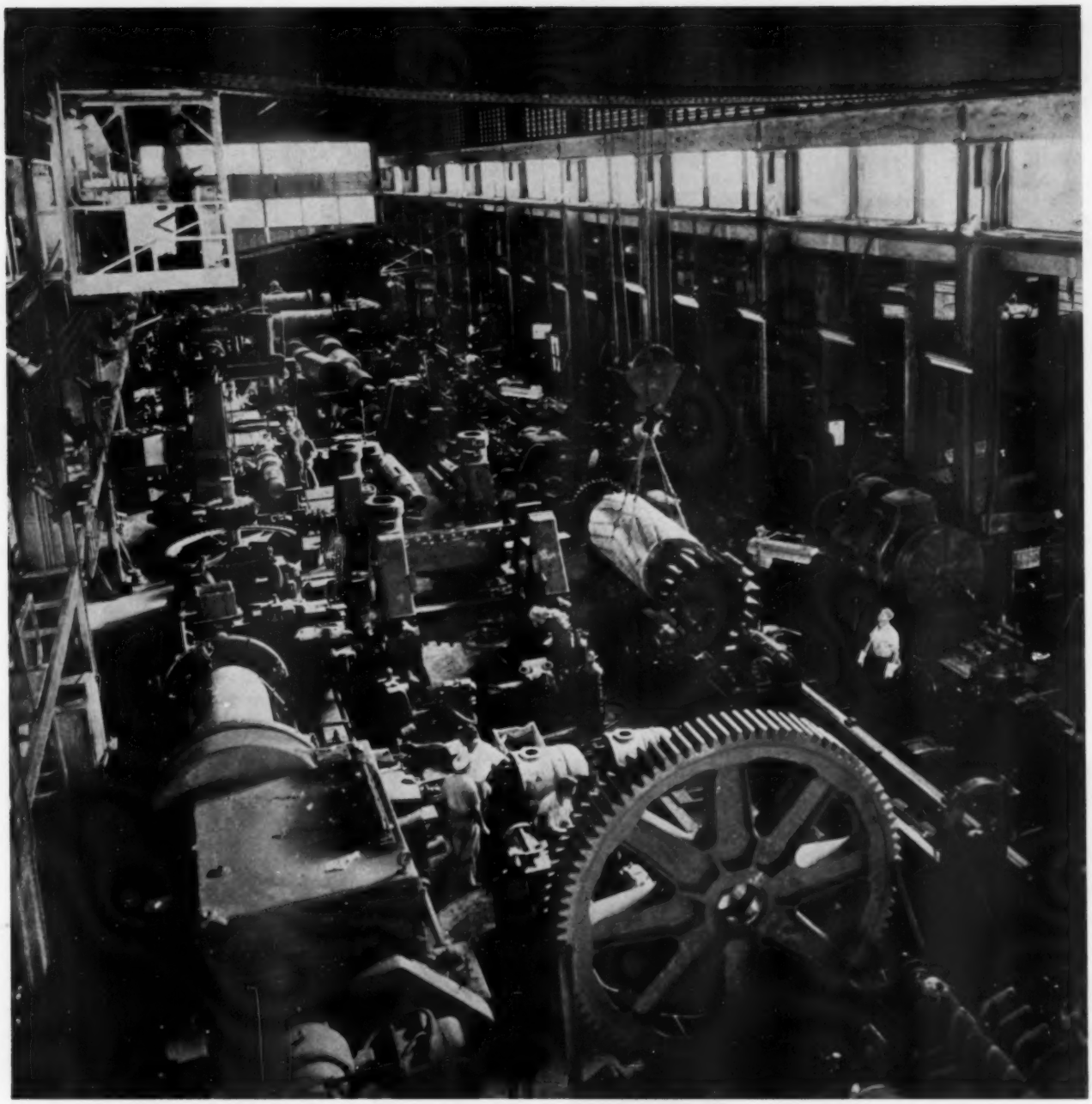

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# Tecnología

## Cristalizacion de Bajo Grado o para Agotamiento, y Recuperación de Sacarosa

*Sugar Research Institute*, Mackay Technical Report No. 46 (1958)

Para realizar experimentos sobre cristalizacion en Masas Cocidas C (de Bajo Grado o Agotamiento) en un grupo seleccionado de centrales azucareros de Queensland (Australia), se diseñó y construyó un cristalizador en miniatura.

El procedimiento seguido fué mantener la masa cocida en el cristalizador a la temperatura dentro del tacho hasta que la cristalizacion fuera completa; después enfriar unos 35o. Fah. y mantenerla a la nueva temperatura hasta que no hubiera descenso en la pureza del líquido madre. Se obtuvieron muestras de miel a intervalos, por medio de un filtro a presión, con el fin de seguir el curso de la cristalizacion por medio de determinaciones de pol y brix. Finalmente se recalentó la masa cocida, simulando las operaciones de la fábrica y se obtuvieron muestras adicionales para determinar el grado de re-disolucion de los cristales. A la descarga del tacho la sobresaturacion de la miel es usualmente entre 1.10-1.20. Se encontró que un enfriamiento de 35o. Fah. realizado en un período de dos horas no provocaba la formación de falso grano; en promedio, la pureza verdadera de la miel se redujo alrededor de un entero por cada 6-8 grados Fah. de enfriamiento; y se llegó a la conclusion que bajo las condiciones actuales de las fábricas, el único factor que limitaba el agotamiento práctico de las mieles finales era la viscosidad. Se consideran 1,000 poises (o unidades de viscosidad) un valor razonablemente alto para mieles agotadas; y para realizar un trabajo eficiente en el departamento de centrífugas, esta cifra hay que reducirla alrededor de 500 recalentando la masa cocida antes de la purga. Generalmente este recalentamiento se hace a unos 125-130o. Fah. Es muy importante la velocidad en el recalentamiento; y si no hay demoras en la operacion el aumento de pureza no excederá de una unidad. Las purezas verdaderas finales variaron en los distintos centrales azucareros seleccionados para el experimento, fluctuando desde 36 hasta 46. Se encontró que la materia sólida insoluble en suspension ejercía un profundo efecto sobre la viscosidad; al remover 5% de los sedimentos de una miel se redujo la viscosidad casi a la mitad.

■

## Bicarbonato de Sodio en Lugar de Carbonato de Sodio para Eliminar las Incrustaciones en los Evaporadores

B. A. BOURNE Y P. S. FRANCIS, *Sugar Journal*, Vol. 22, No. 5, pp. 23-27 (1959)

En una fábrica de azucar que muele caña cultivada en suelos de turba y mucha materia orgánica en los Everglades de la Florida, se presentaba en el cuarto cuerpo de un evaporador a cuádruple-efecto, una incrustación muy dura compuesta mayormente de sulfato de calcio. El tratamiento ordinario de hervir sosa cáustica primero y ácido clorhídrico después, resultaba insuficiente y costoso. Las tentativas que se hicieron para convertir el sulfato de calcio en carbonato por medio del carbonato de sodio a ebullicion tambien fracasaron. El problema fue resuelto usando el proceso siguiente:

Hervir durante tres horas una solucion al 10% de sosa cáustica y enjuagar con agua; luego hervir durante tres horas una solucion al 6-7% de bicarbonato de sodio conteniendo 0.05% de Triton X-114 como agente humectante, enjuagar y aplicar una solución entre 3 al 5% de ácido clorhídrico a la temperatura ambiente hasta el termino visual de la reacción, la cual usualmente toma de 10 a 20 minutos. La acción favorable del bicarbonato de sodio en este proceso consiste, en que al hacer la ebullición con la presencia de la substancia citada, el bicarbonato desprende gas bióxido de carbono el cual actúa sobre la superficie de la incrustación, facilitando la conversión de los sulfatos en carbonatos, los cuales son mas fácilmente atacables por el ácido. Esta actividad se facilita circulando aire a través de los tubos de la calandria de manera que la solución alcalina circule mejor. Los resultados obtenidos han sido muy satisfactorios.

■

## Nuevo Sistema para Filtrar Cachazas de Caña en el Central Plata

*Por* RAMON RAMOS JR. *y* PEDRO J. RODRIGUEZ

En este trabajo se exponen los resultados de un nuevo sistema de filtracion que proporciona un filtrado claro que puede alimentarse directamente a los evaporadores. El nuevo Proceso de Filtracion Rapi-Floc involucra una coagulacion controlada usando cal y un poli-electrolito. Las modificaciones al Filtro Rotativo comprenden la adicion de un coagulador, tapar la cubeta o batea colectora de los lavados y un medio filtrante a base de una tela especial. La operacion continua durante una zafra completa de un filtro Oliver 8 x 12′ demostro un 50% de aumento en capacidad, menor contenido de sacarosa en la torta y un filtrado claro.

Para un segundo tamizaje del jugo crudo y con el fin de eliminar las particulas mas finas de fibra previamente a la defecacion, se utilizo un nuevo tipo de colador curvo estacionario. Se exponen los beneficios generales de este segundo tamizaje en las fases de clarificacion y filtracion y otras del proceso. Se

atribuye en parte a este nuevo Tamiz Dorr-Oliver DSM el mejor trabajo realizado por el clarificador y el filtro del Central Plata durante la pasada zafra.

■

### Deterioro de Mieles Finales de Caña de Azúcar en Almacenaje

J. M. SAHA Y ASOCIADOS, *Indian Sugar*, Vol. 8, No. 12, pp. 737-767 (1959)

Las mieles procedían de una fábrica azucarera trabajando bajo el proceso de doble sulfitacion y fueron almacenadas en un tanque de acero de 38 pies de diámetro y 20 pies de altura, con capacidad para unas 490 toneladas de mieles. Se instalaron tubos dentro del tanque para extraer muestras a ocho niveles, con diferentes distancias de las paredes. Se analizaron las muestras tomadas cada mes de cada uno de los niveles y se midió la temperatura de la miel al extraer cada muestra. Los ensayos duraron diez meses.

El deterioro más activo de la miel comenzó en el mes de Julio y se hizo mas rápido durante el período de los monzones, con respecto al Brix, la materia seca, la polarización, la sacarosa, las purezas verdadera y por gravedad, los azucares fermentables, el color y el Coeficiente Glucosa/Cenizas. El deterioro comenzó por la capa superior y se mantuvo al máximo en esa zona en todos los períodos; se manifestó gradualmente hacia abajo con intensidad decreciente y se desarrolló al mínimo en la zona del fondo. La temperatura durante el tiempo de almacenaje fue alrededor de 105o. Fah. en Abril, bajando a 87.13o. Fah. en Noviembre. Al principio hubo espuma y elevación de temperatura en la capa superior asentándose despues.

El efecto económico principal de este deterioro parece consistir en el gran aumento en el Coeficiente Azucares Reductores/Cenizas, el cual representa una pérdida en azucares fermentables y consecuentemente una pérdida del alcohol obtenible por fermentacion. Se calcula que para el período de diez meses citado la pérdida de alcohol fue alrededor del 13% del volumen total de mieles; y la pérdida en la zona o capa superior ascendió al 50% aproximadamente.

■

### Cambios en las Propiedades de la Amberlita IRA-401 (C1) durante un Largo Periodo de Trabajo en una Refineria

KAZUMASA SUZUKI, *Memoria de la Sociedad Japonesa de Investigadores en Refinacion de Azucar*, Vol. 8, pp. 22-29 (1959)

Un estudio durante dos años sobre los cambios en las propiedades físicas y químicas de la Amberlita, usada para decolorar, ha llevado a los siguientes resultados: Despues de 240 ciclos hubo un 10% de declinacion en la potencia fisica debida a degradacion de la estructura polímera. Se encontro un aumento de la densidad absoluta, debida a la adsorcion irreversible (suciedades acumuladas) de impurezas organicas e inorganicas. Le cantidad de agua absorbida por la resina dilatada fue mayor con la resina usada que con la nueva; pero las propiedades de redilatacion de la resina seca disminuyeron con los ciclos y su coeficiente de contraccion tambien disminuyo en un electrólito en solucion. Se llegó a la conclusión que éstos cambios dependen menos de la concentración del permutador y son mas bien consecuencia de la degradacion de la estructura polímera y de las suciedades adsorbidas. Hubo un 40% de


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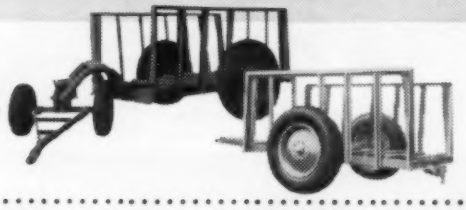

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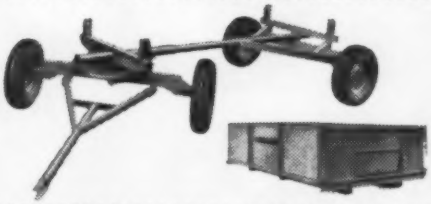
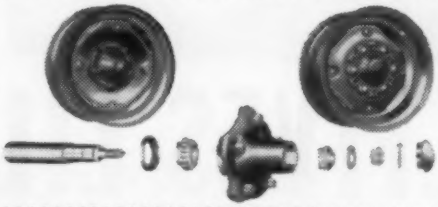


RUEDAS, CUBOS, HUSILLOS y EJES para CUALQUIER VEHICULO



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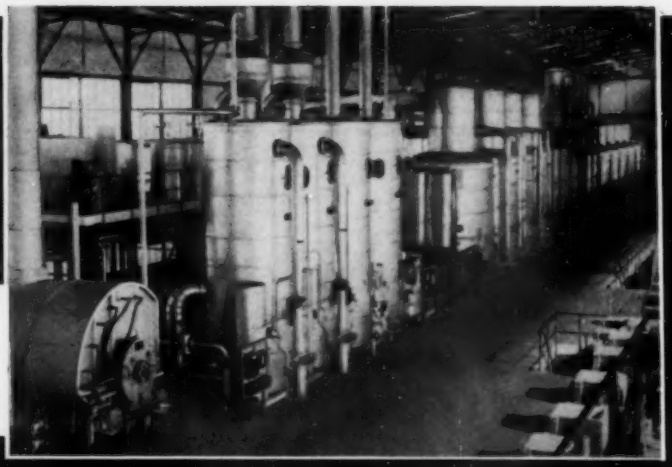
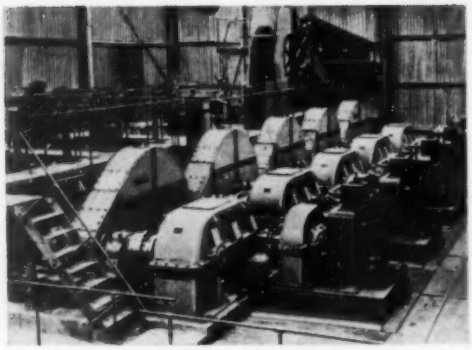
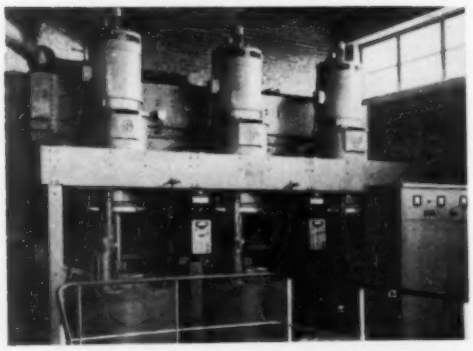


## en su FÁBRICA DE AZÚCAR de caña o de remolacha

Planta de cincos molinos.
Central Azucarero Ureña (Venezuela)



Centrifugas completamente automáticas.
Fábrica de azúcar de Vauciennes (Francia)



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- Molinos de caña
- Aparatos de alcalización y sulfitación
- Clarificadores
- Filtros
- Evaporadores
- Tachos al vacio
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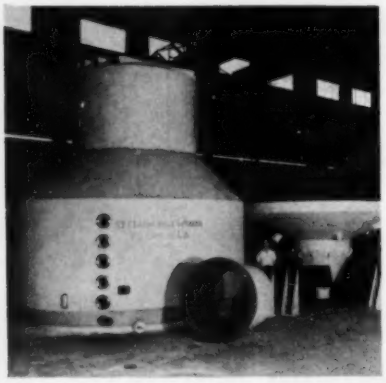

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disminucion en la capacidad de los aniones separadores de sales; y alrededor del 60% de disminucion en la capacidad de premutacion aniónica. En cada ciclo, alrededor de un 30% de los grupos básicos fuertes permanecieron como grupos básicos debiles. La resina utilizada para la decoloracion se regeneraba con una solucion de Na Cl. Pero la resina tratada bajaba considerablemente el pH del efluente cuando se volvia a usar despues de la regeneración. Este resultado adverso se neutralizaba tratando la resina con una solucion al 3.5% de soda ash (carbonato sódico anhidro) a 40 grados centigrados. No obstante los cambios mencionados en las propiedades, la capacidad decolorante no resultó grandemente disminuída. Parece que la vida de la resina depende mas de las suciedades adsorbidas y de su resistencia física.

■

## Una Nueva Idea para Mantener el Vacío en los Tachos

*Por* ALFRED WEBRE

Un vacío constante y de la magnitud correcta es esencial para producir cristales de azucar uniformes, libres de conglomerados y de granos finos. Para lograr ésto ha sido práctica general el empleo de condensadores independientes para cada tacho; pero como consecuencia de varios factores ciertas fluctuaciones en el vacío aún persisten. Por éstos motivos se ha considerado necesario además de los condensadores independientes instalar bombas de vacío independientes.

Eyectores Condensadores, bombas de vacío reciprocantes y bombas de vacío a chorro de vapor han sido usadas en conexión con los condensadores individuales, cada una de ellas con sus ventajas y sus desventajas. Pero como equipo digno de confianza, sencillo, seguro y flexible, la bomba de vacío hidráulica sobresale entre todos.

Además de un breve historial sobre las aplicaciones originales de ésta bomba, el autor de este trabajo dá detalles completos para construír una bomba de vacío hidráulica con capacidad para un tacho de 14 pies de diámetro; y sus aplicaciones a distintas unidades de una fábrica de azucar.

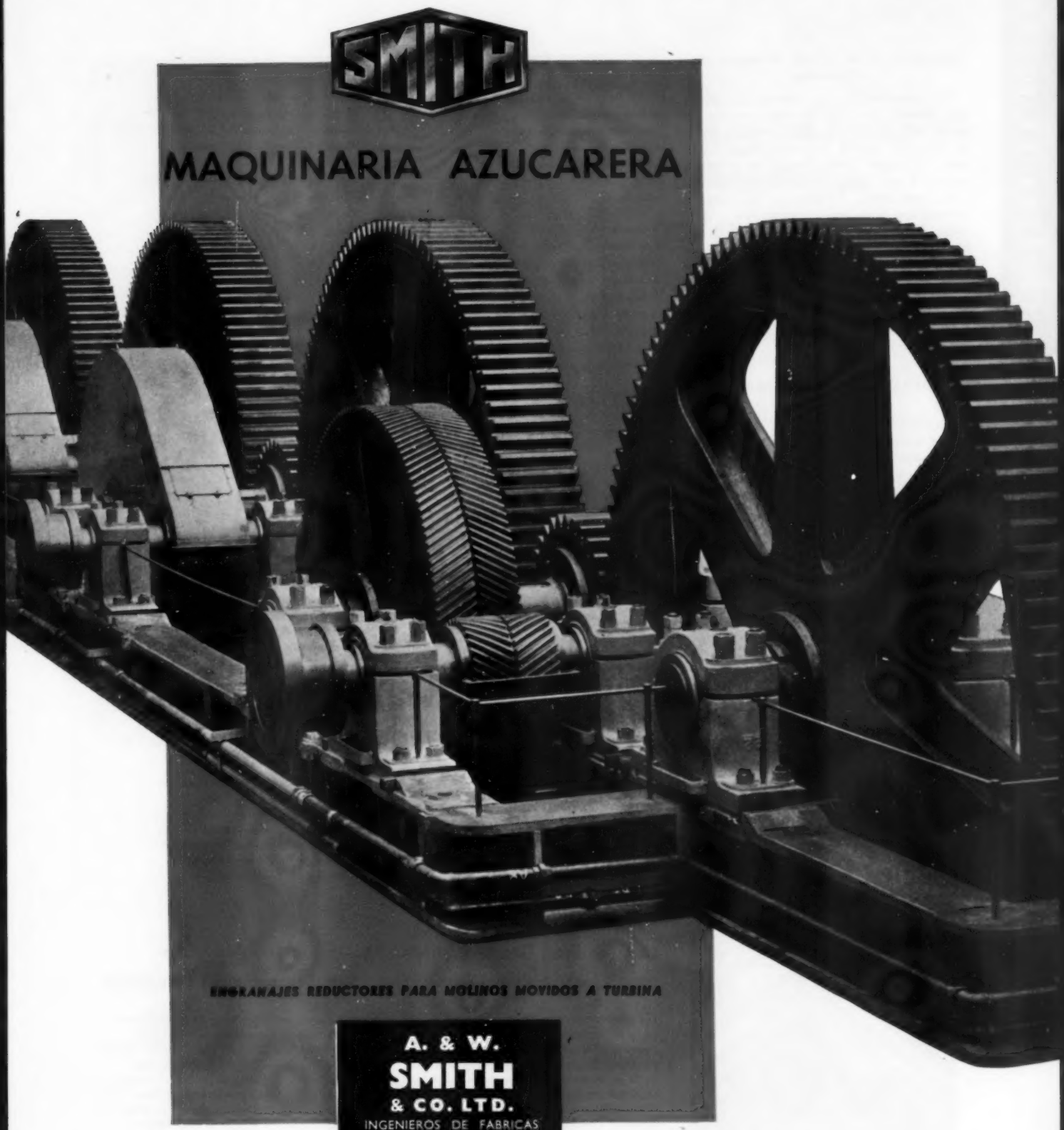
■

## El Metodo Quentin de Permutación Iónica en las Fábricas Europeas de Azucar de Remolacha

F. SCHNEIDER, *Zucker*, Vol. 12, No. 14, pp. 322-331 (1959)

En los ultimos tiempos la fábricas Alemanas han venido haciendo uso creciente del Metodo Quentin de Permutación Iónica con el propósito de reducir la pureza de las mieles finales. En este Metodo se permuta el potasio por el magnesio. La acumulación del magnesio en las mieles baja la solubilidad de la sacarosa a tal punto que el coeficiente de pureza de las mieles se puede reducir unas cuatro unidades. El aumento de rendimiento alcanza a 0.20 - 0.25% de remolacha y la miel resultante queda aun dentro de las especificaciones de sales que prevalecen en el comercio. El proceso tiene que ser controlado estrictamente a fin de lograr el contenido deseado de magnesio en las mieles; y este control se obtiene por medio de un sistema de bombas y válvulas accionadas automáticamente mediante variaciones en la conductividad electrolítica. Este sistema de control (que ha sido perfeccionado por la firma de von Dolffs y Helle) es sencillo y de limitado costo. En Austria se usa un sistema similar que consiste en permutar las sales alcalinas del jugo por amoníaco, el cual es a su vez reemplazado por calcio que reduce la solubilidad de la sacarosa, obteniendose un aumento en el rendimiento de azucar entre 0.5 - 0.6% de remolacha.

La miel tiene un coeficiente de pureza de 50. No hay restricciones en Austria para la venta de mieles de purezas bajas.

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## Honores al Sr. I. H. Kemper en Gálveston

En Enero 14 próximo pasado, en Gálveston, Texas, fué ofrecida una comida en honor del Sr. I. H. Kemper, Presidente de la Directiva de la Imperial Sugar Company, de Sugar Land, Texas; en reconocimiento á sus numerosos años de servicios á la comunidad. Además de sus amplias actividades financieras, industriales y agrícolas, el Sr. Kemper tiene una destacada hoja de servicios cívicos. Fué alcalde de Gálveston en 1917-18 y tesorero del primer consejo de comisionados de la ciudad. Es miembro de casi todas la organizaciones cívicas de Gálveston.

■

## Guantánamo Sugar Co. Investigando en la Florida

En la reunión anual de la Guantánamo Sugar Company se anunció que oficiales de la compañía estaban investigando las posibilidades para continuar operaciones en la Florida. Los activos de la empresa en los Estados Unidos ascienden aproximadamente á $400,000. El Gobierno Cubano se apoderó de sus tres centrales azucareros sin remuneración ó compensación alguna. La compañía se propone someter documentos al Departamento de Estado con el fin de establecer una reclamación legal contra el Gobierno de Cuba; pero las perspectivas sobre pago inmediato ó eventual lucen obscuras. Las acciones de la empresa, cotizadas en tiempos pasados en la Bolsa de Nueva York, están en proceso de ser eliminadas de lista.

■

## Lamborn Cierra su Oficina en La Habana

La firma Lamborn, Craig & Company, corredores internacionales de azúcar, anuncian el cierre de sus oficinas en La Habana, despues de 47 años de servicios contínuos.

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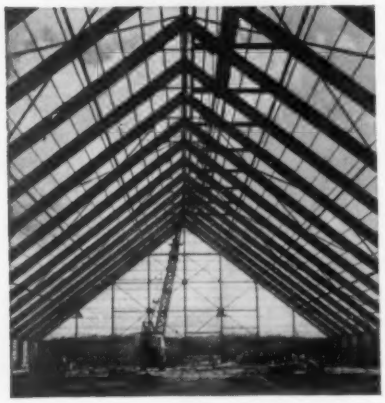
## La American Molasses Adquiere la Food Products

Segun aviso emitido por Frank C. Staples, Presidente de la American Molasses Company ésta empresa ha adquirido el capital total emitido por la Food Products Company, mediante el intercambio de las acciones correspondientes. La Food Products, con oficinas principales en Kansas City, es un proveedor destacado de ingredientes técnicos para las industrias de panadería y lechería. Su presidente, el Sr. Robert M. Rapaport, continuará en el mismo cargo.

La American Molasses opera en gran escala como empresa bien conocida en refino granulado y azúcar líquido, siendo el mayor productor del mundo de mieles mezcladas comestibles.

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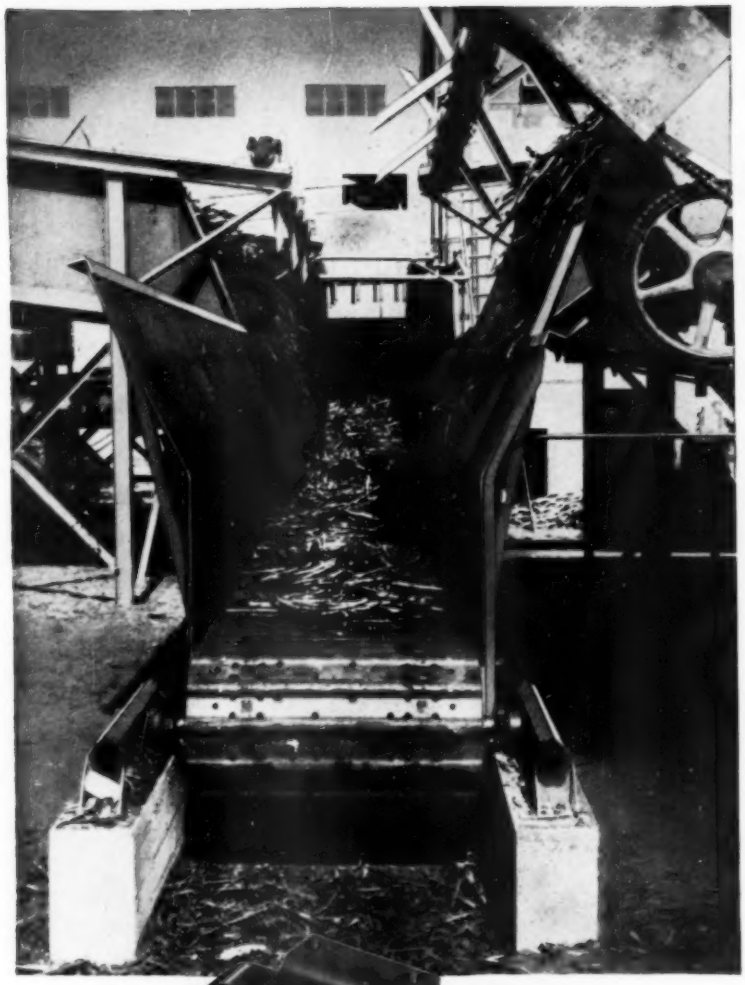

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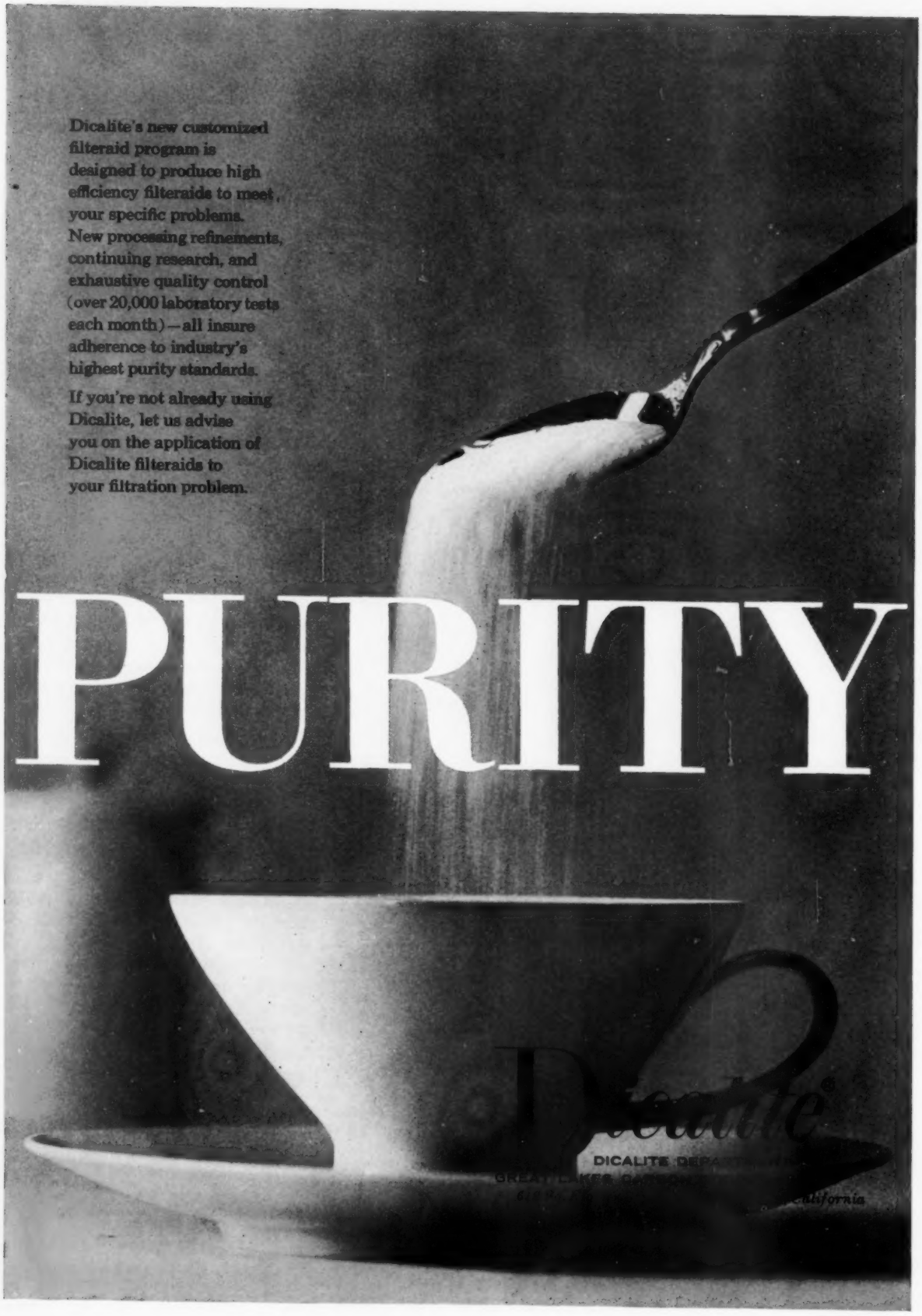
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